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AFCRL-62-242

UNIVERSITY OF WASHINGTON
DEPARTMENT OF
METEOROLOGY AND CLIMATOLOGY
Seattle, Washington

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Detailed Analyses of Selected Pacific Storms
Based on Continuous Radar Records and
Short-Interval Serial Ascents

Vol I. Case of January 6-8, 1961

BY

RICHARD J. REED

DECEMBER 1961

Project No. 8641
Task 86414
Contract No. AF 19 (604)-5192
Technical Report No. 3



Prepared for
GEOPHYSICS RESEARCH DIRECTORATE
AIR FORCE CAMBRIDGE RESEARCH LABORATORIES
OFFICE OF AEROSPACE RESEARCH
UNITED STATES AIR FORCE
BEDFORD, MASSACHUSETTS

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I. GENERAL INFORMATION

INTRODUCTION

Preliminary study of Pacific storm systems by means of routine synoptic data and continuously recorded radar echoes [Kreitzberg (1961)] revealed a considerable diversity and fluctuation of echo types in relation to synoptic features and much complexity and deviation from ideal models in the storm structures. For the purpose of clarifying certain puzzling aspects of the wind and temperature (frontal) structures and of seeking an explanation for the seemingly erratic changes in echo character, a program of short-interval, serial ascents was inaugurated in January 1961. During the remainder of the winter and the ensuing spring five series of observations of one to three days duration were undertaken in which radiosondes were released as frequently as once an hour, while the radar echoes from an AN/APQ-39, 1.87 cm vertical-beam radar were being continuously recorded on film strip. The interpretation of the large quantity of data obtained during the special series will require considerable time. Meanwhile, it has seemed advisable to make available to interested parties the complete radar and synoptic records and preliminary analyses for each series. The present volume is one in a series of five which is being prepared to fulfil this objective.

INSTRUMENTS

The APQ-39 radar is housed in the Meteorology Building with the vertically-pointing antenna mounted directly overhead on the roof. The echo is observed visually on an A-scope and is photographed continuously on a second scope which presents an intensity modulated trace. During the first three series the scope

was photographed at a fixed gain setting. A sinusoidally varying gain which extended the dynamic range was in operation during the final two series.

Following the fourth series the sensitivity of the set was increased and even rather thin cirrus cloud was recorded on the film. Prior to this time, drizzle was the smallest hydrometer observed. Even after the improvement in sensitivity, rather dense-looking cumulus escaped detection.

The GMD-1 radiosonde was located during the first series at the edge of the University Golf Course on the lower campus. Unfortunately, interference by the University Hospital caused valuable records to be lost during this series, and before the second series was begun the radiosonde was moved to the roof of the hospital where no further difficulty was experienced.

TOPOGRAPHY

Major topographical features of the area surrounding the project site are depicted in Figure 1. The University is situated in an elongated north-south basin about a mile from the east shore of Puget Sound. To the west lie the Olympic Mountains with peaks rising to nearly 8,000 feet and beyond these the Pacific Ocean. To the southwest of the station a gap exists in the coastal mountains which provides a favored entry point of maritime air into the Seattle area. About twenty miles east of the station rises the Cascade Range, a higher and more continuous barrier.

Also shown in the figure are the locations of weather reporting stations. At the Seattle-Tacoma Airport temperature soundings are taken twice a day and rawins four times daily. Special pilot reports were provided by McChord Field in Tacoma and Paine Field in Everett.

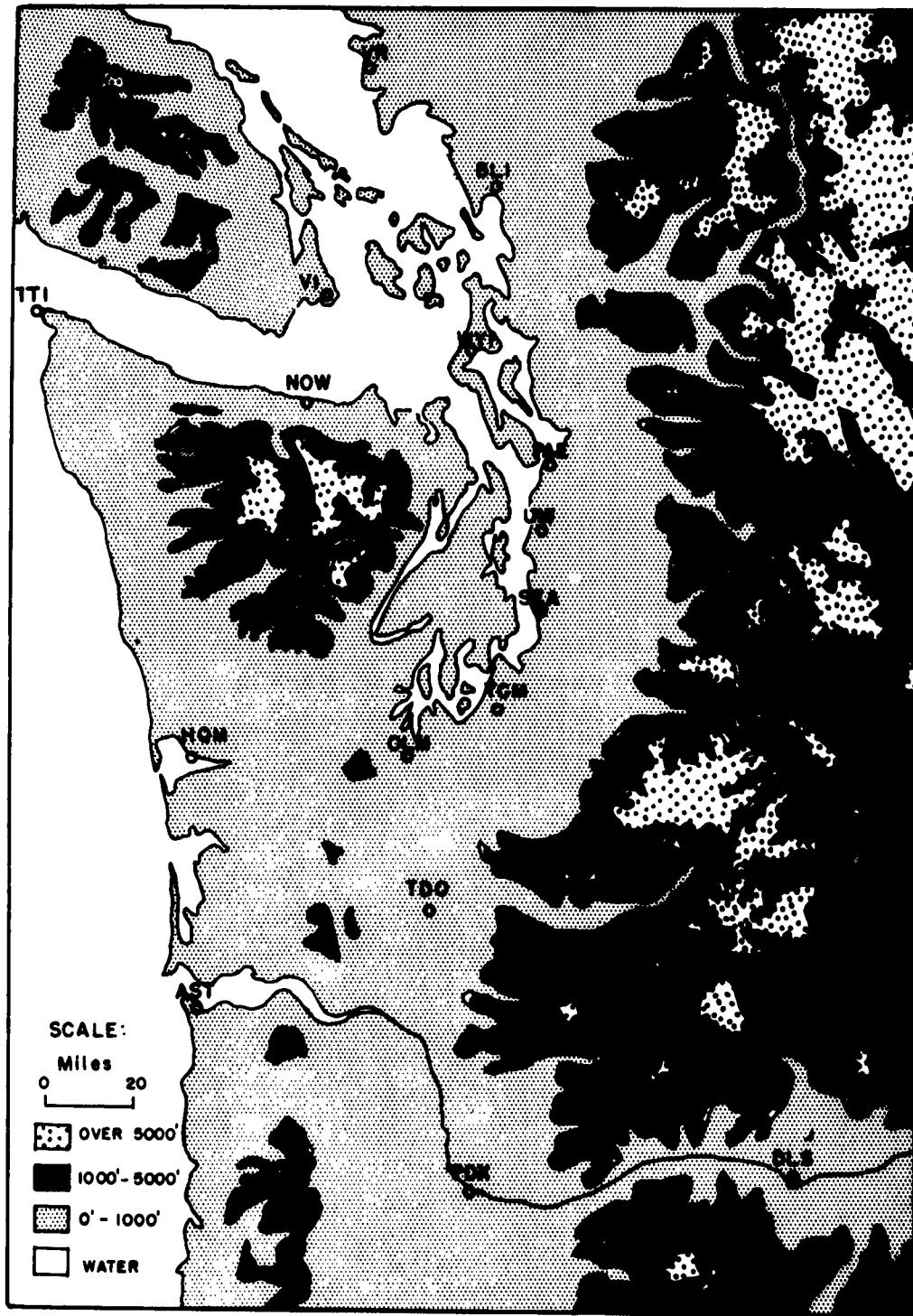


Fig. 1. Topographical map of western Washington with locations of selected stations.

DATA AND ANALYSES

1. Synoptic Charts.

These were prepared according to standard procedures at the following levels: Surface (both 6-hourly synoptics and hourly sectionals), 850 mb, 700 mb, 500 mb, 250 mb.

2. Time Sections.

The analyses are based on plotted temperatures, pressures, and winds. Only the winds are shown on the sections reproduced here since sounding data are provided separately. For soundings taken by the U.S. Weather Bureau, temperatures, dew points, and winds were plotted at coded points. For special soundings, temperatures were plotted at 4°C intervals and at significant points between. Dew points were plotted at significant points in the humidity trace and at points corresponding to the plotted temperatures. Winds were plotted for each minute up to the fourteenth minute (roughly 14,000 feet) and every second minute beyond. In computing the winds two-minute averages were used up to the fourteenth minute and four-minute averages beyond.

Cloud analyses are based on radiosonde traces, radar echoes, ground observations and pilot reports.

3. Barograph Traces.

Copies were made of the microbarograph trace located at the U.S. Weather Bureau office in downtown Seattle.

4. Radar.

The radar record for each series consists of 35 mm film exposed continuously at a rate of 10 in/hr. An angel, evidently caused by reflection of a side lobe from a church steeple, is present on all film near the 5,000-foot marker despite

efforts at shielding. Below the scope picture is a counter which gives the accumulated precipitation in hundredths of an inch, as measured by a tipping bucket gauge, and a clock from which the time can be read at approximately $2\frac{1}{2}$ -minute intervals.

5. Soundings

The data from soundings taken at the University of Washington were reduced in the following manner. Temperatures, relative humidities, elevation angles, and azimuth angles were read every half minute from the original records. The dew points, heights, and wind data were computed from these readings on the IBM 709 in the Research Computer Laboratory.

The soundings from SEA were reduced in a slightly different fashion. The 1-minute elevation and azimuth angles, as well as the pressure-time data, were obtained from WBAN-20; significant temperatures, relative humidities, and the corresponding pressures were obtained from the data blocks on WBAN-31A, B, and C. From this information the IBM 709 was used to obtain the information at 1-minute intervals listed in Appendix A.

The plotted soundings give (1) for U. W. soundings: every significant point plus every third half-minute point below 600 mb and every fourth above 600 mb (2) for SEA soundings: every significant point. Data for all the half-minute points for U. W. soundings and all minute points for SEA soundings are included in Appendix A.

ACKNOWLEDGEMENTS

We would like to thank the following persons for assisting in various phases of the program: Mr. Albert K. Showalter, Chief, Observations and Stations, U.S. Weather Bureau, for authorizing 6-hourly soundings at Seattle-Tacoma Airport on the special days and the observers for working up the extra soundings; Mr. Ralph W. Hester, Meteorologist-in-Charge, Boeing Field, Seattle, and his assistants, especially Mr. John Zimmerman for providing facsimile data; Major Buchanan, Paine Field, Everett, and Captain Roddee Lord, McChord Field, Tacoma, for forwarding pilot reports from these locations; Mr. Norman Thyer, University of Washington, for his assistance in the writing of a computer program for processing the sounding data; and Mrs. Nancy Levin, University of Washington, for providing an extra and much-needed hand during most of the ascents.

II. THE CASE OF 6-8 JANUARY 1961

SYNOPTIC DESCRIPTION

Although the intent was to study occluded type cyclones, the warm front in this case was so unusually sharp in the Pacific Northwest area that it was decided to proceed with ascents even though it appeared that Seattle would enter or nearly enter the warm sector.

At 1200Z on 6 January (Fig. 2.) the warm front extended from the Oregon Coast westward to an occluded front about 200 miles west of the picket ship S.P. The occluded low was located about 300 miles south of the weather ship 4YP, and the cold front extended from the peak of the warm sector southwest to a position slightly west of ship 4YN.

During the ensuing 36 hours (Figs. 4, 6, 8,) the low center moved slowly northeastward. Over water the warm front gradually advanced northward and weakened. Over land it remained nearly stationary in northern Oregon and likewise weakened. At first the cold front progressed slowly as a shallow wave developed on it. During the final 12 hours it accelerated and swept ashore bringing brief but pronounced pressure rises.

A closed cyclonic circulation lay above the surface occlusion at the 500-mb level (Figs. 2, 4, 6, 8). Anticyclogenesis occurred over the western states during the period. The warm front, which was located near the Canadian border at the beginning of the sequence, gradually dissipated as the ridge strengthened. The cold front as it came ashore was associated with a small, sharp upper-level trough which probably was present but unidentifiable over the ocean at the earlier hours.

Further information concerning the upper-level circulation, temperatures and fronts appears in Figures 3, 5, 7, and 9.

The sectional maps (Fig. 10) reveal the details of the cold or occluded front passage. At most stations a sudden barometric rise or pressure jump was observed at the time of passage, as in Figure 11. Not all stations, however, showed significant wind changes immediately. Eugene, Oregon, was one of the few stations that reported strong winds with the jump. Some property damage and the loss of one life were attributed to the sudden squall. Also shown in Figure 11 are temperature traces at surface, 850 mb, 700 mb, and 500 mb, and the height trace at 500 mb.

TIME SECTION

The serial ascents appear in Figure 12 and the time section analysis based on the ascents in Figure 13. The cloud analysis on the time section was derived from hourly ground observations, the radar echoes in Figure 14, the pilot reports listed in appendix B, and from the moisture distribution on the soundings. At times there were not sufficient data to locate the cloud boundaries accurately and at other times the data were conflicting. The tops of lower layers and bases and tops of upper layers must therefore be regarded as subject to considerable uncertainty.

According to the synoptic and radar time sections the sequence begins with a moderately well-defined warm frontal surface at 16,000 feet with a middle cloud deck inclined along it and with a cirrus overcast above. Echoes are observed from the middle deck. These are of the stable type and show generating cells near 20,000 feet and some stalactic formation at the echo base. The frontal zone contains a number of sublayers of particularly large temperature gradient.

At about 1800GCT breaks appear in the altostratus and the radar echoes become sporadic. However, as the storm approaches and the frontal surface continues to lower, the clouds thicken again and a deep precipitating layer is observed.

Rain commences at the ground when the middle cloud reaches 8,500 feet. Meanwhile, new cloud layers form at successively lower levels in the rain-moistened air. A general lowering of both the lower and upper cloud layers seems to accompany the lowering of the front, suggesting an upglide motion in the warm air mass.

As the rain comes to an end, the echoes take on a more convective character, and isolated cells appear to bridge both layers. It is important to note that from the point of view of the air parcels what we refer to here as the ending of precipitation may actually be the beginning. If the air is gliding up along the frontal surface, as seems likely, the echoes at 0400GCT on 7 January are newly formed echoes, not decaying ones.

Following the cessation of the rain, the warm front does not come to the ground but flattens into an inversion surface which remains near 2000 feet. The predominant cloud during the interval between the flattening of the warm front and the arrival of the cold front is a broken-to-overcast cirrus.

Immediately preceding the arrival of the surface cold front (actually an occlusion in the shallow layer next to the surface) the clouds temporarily dissolve. From the 0000GCT sounding for the 8th it appears in fact that the front has already passed at intermediate levels, and that the dissolution is associated with subsidence in the cold air.

Shortly after the time of frontal passage at the surface a sharp-edged cloud mass drifted in at middle levels. An elevated echo of more or less stable type was noted on the radar, and some very light rain reached the ground briefly. Sporadic shower activity developed in the cold air and continued for the remainder of the period. The later echoes were more convective in appearance, and the bases and tops of the cells were located at lower elevation than in the cell immediately behind the front.

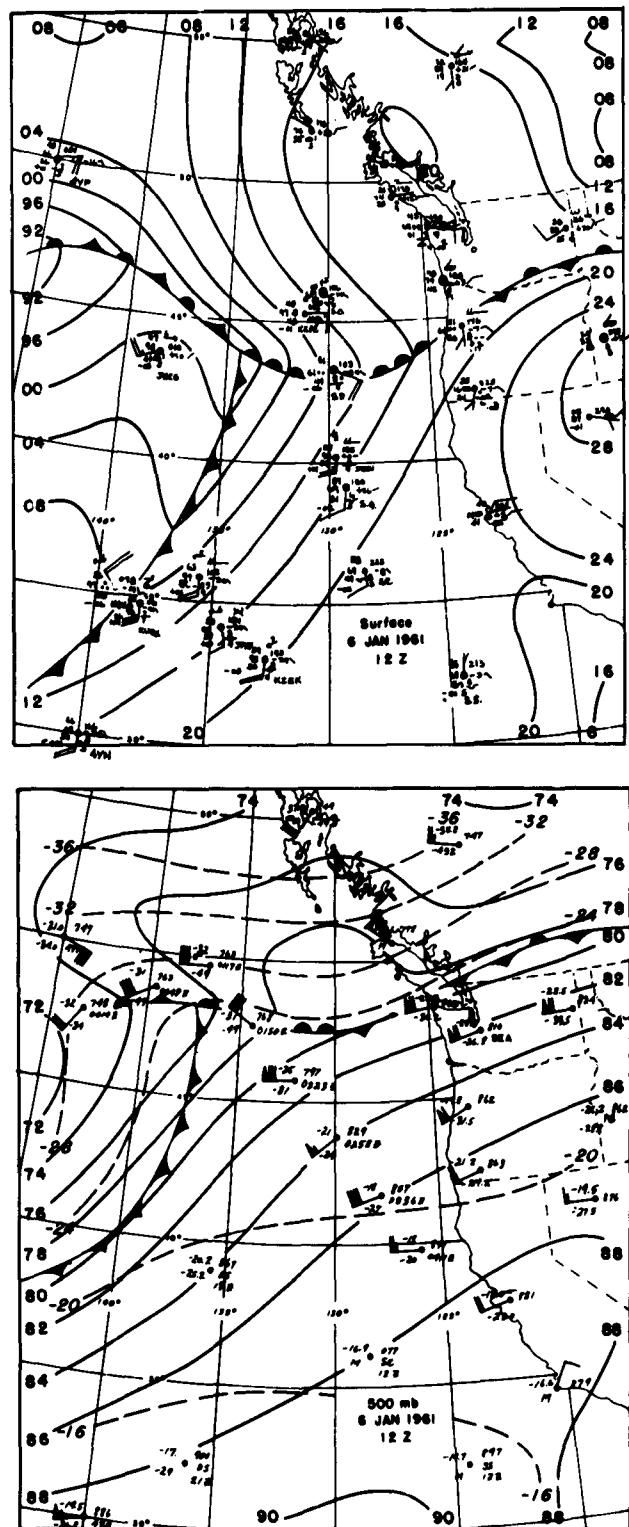


Fig. 2. Charts for 1200GCT January 6, 1961. Upper, surface; lower, 500 mb.

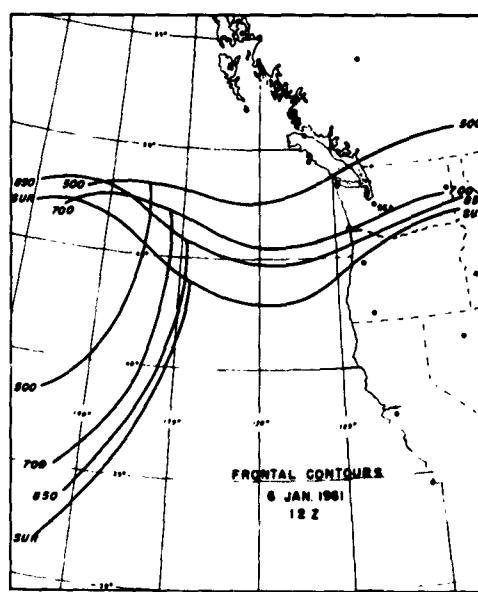
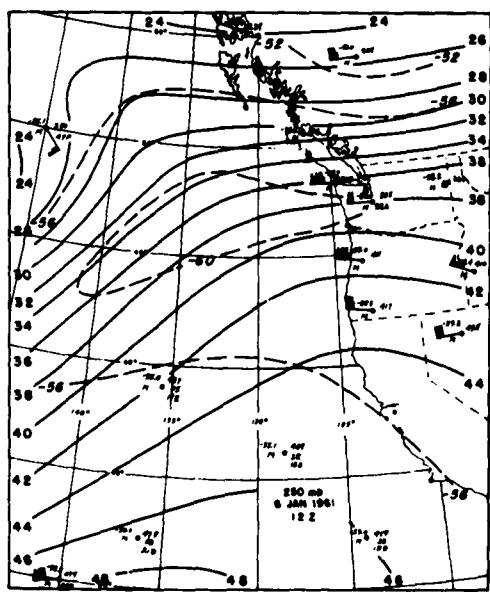
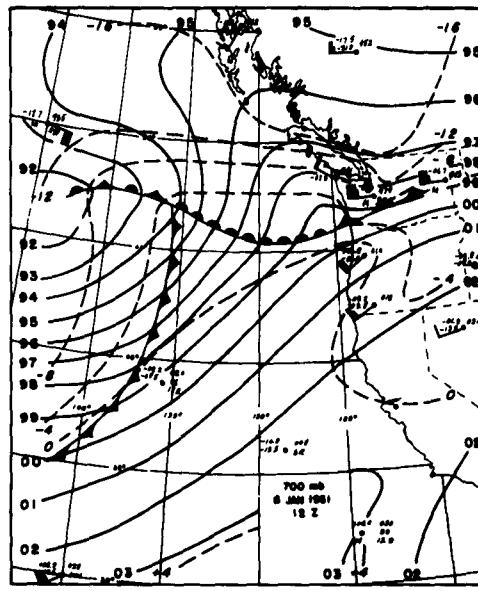
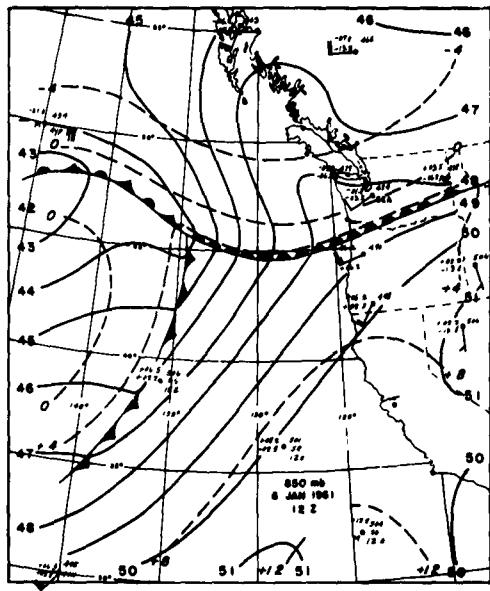


Fig. 3. Charts for 1200GCT January 6, 1961. Upper left, 850 mb; upper right, 700 mb; lower left, 250 mb; lower right, frontal contours.

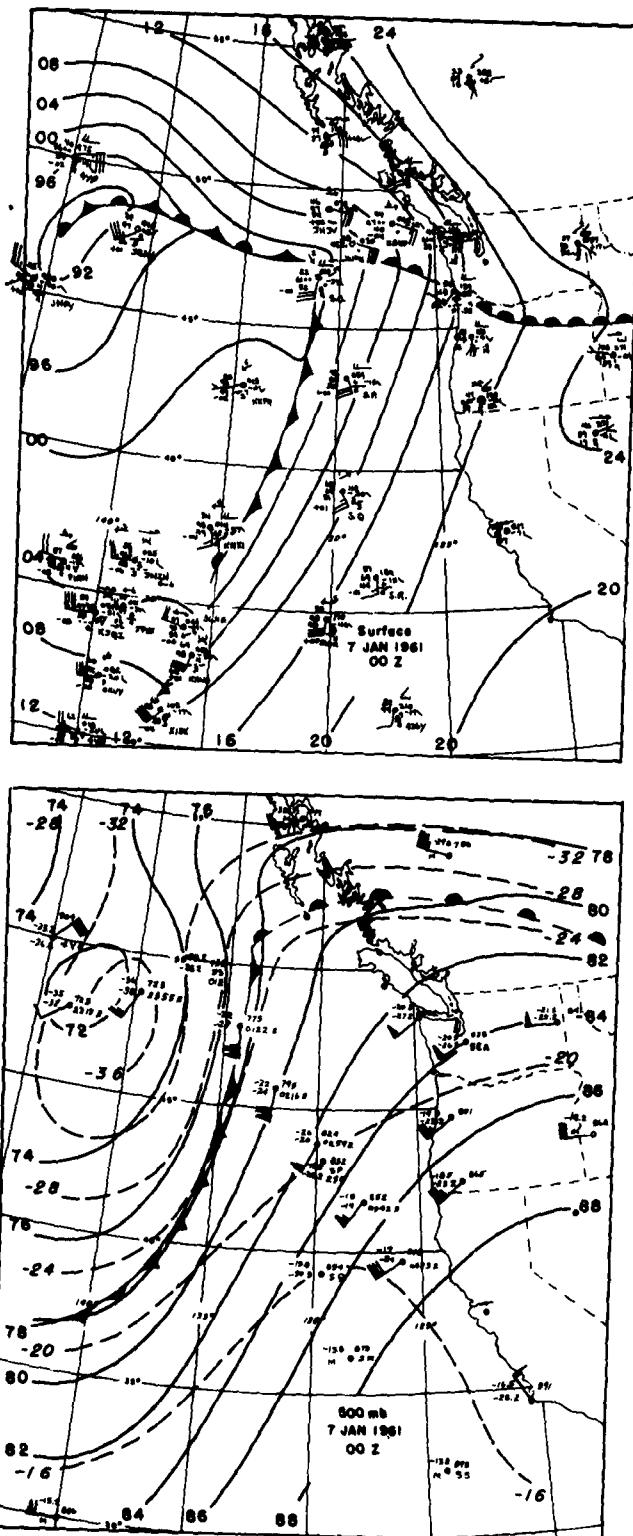


Fig. 4. Charts for 0000GCT January 7, 1961. Upper, surface;
lower, 500 mb.

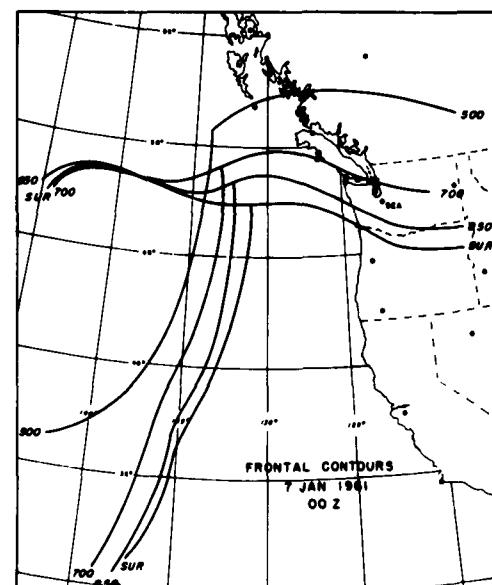
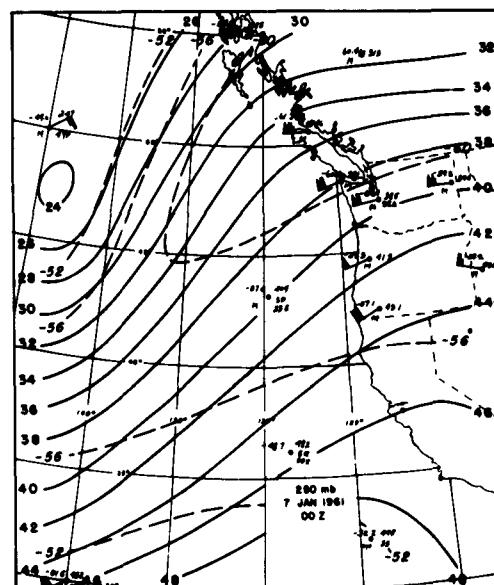
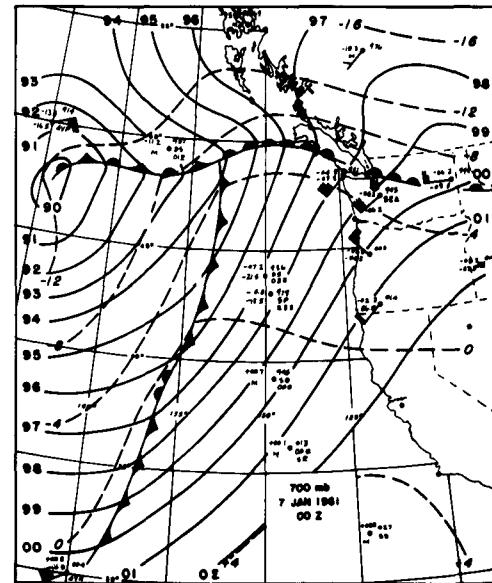
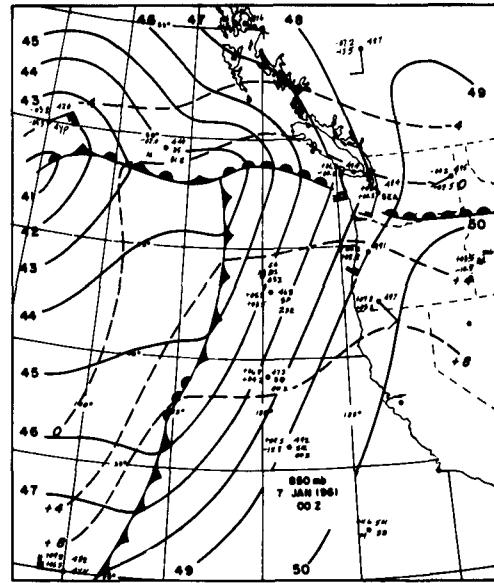


Fig. 5. Charts for 0000GCT January 7, 1961. Upper left, 850 mb; upper right, 700 mb; lower left, 250 mb; lower right, frontal contours.

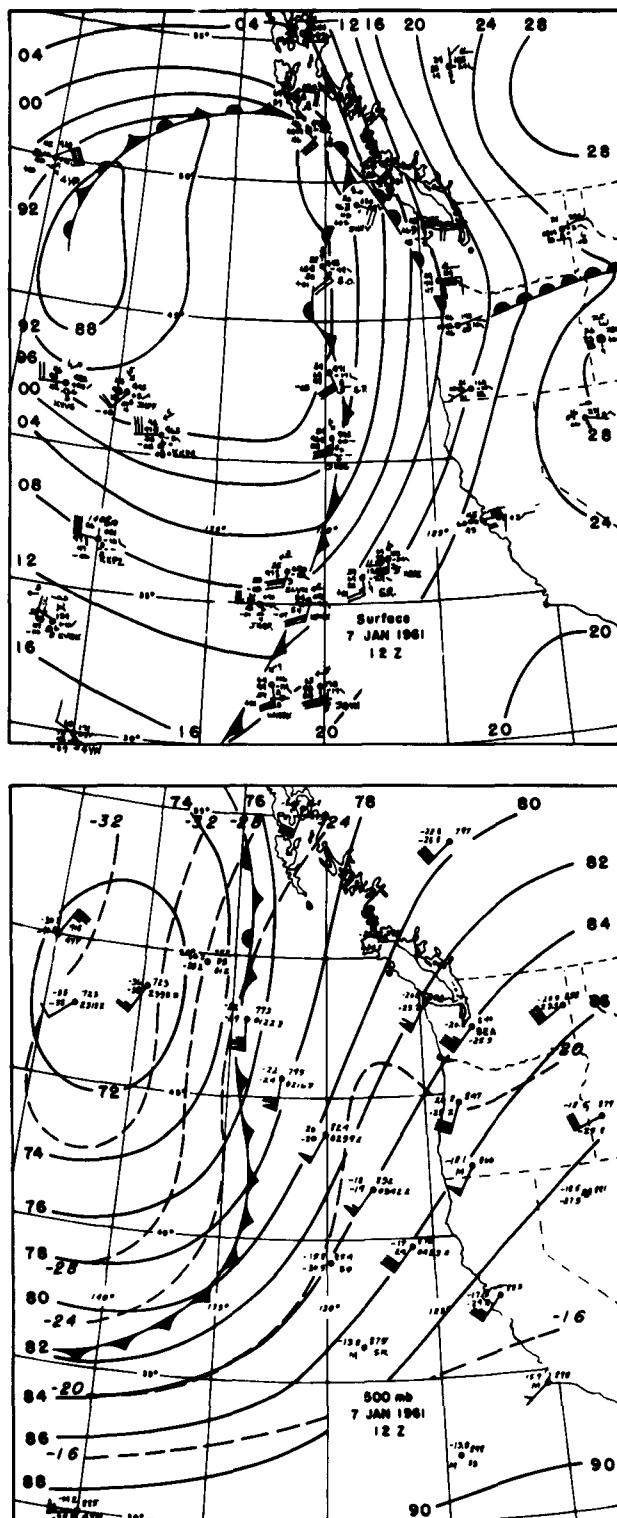


Fig. 6. Charts for 1200GCT January 7, 1961. Upper, surface; lower, 500 mb.

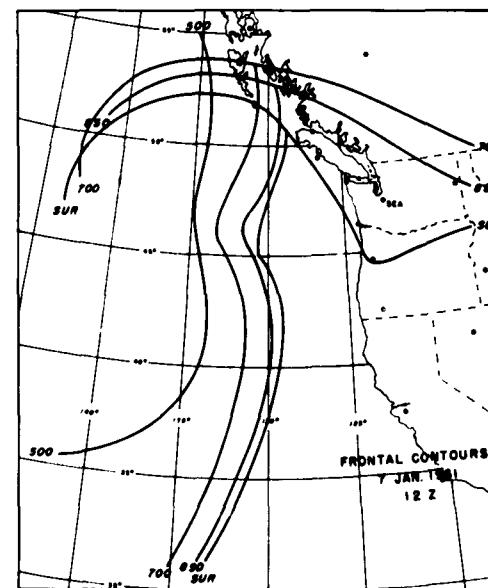
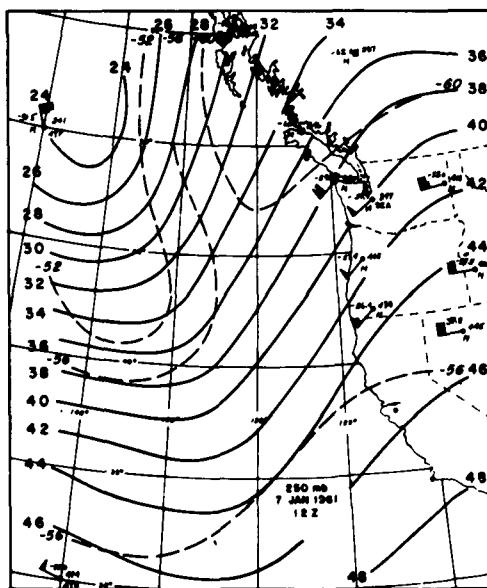
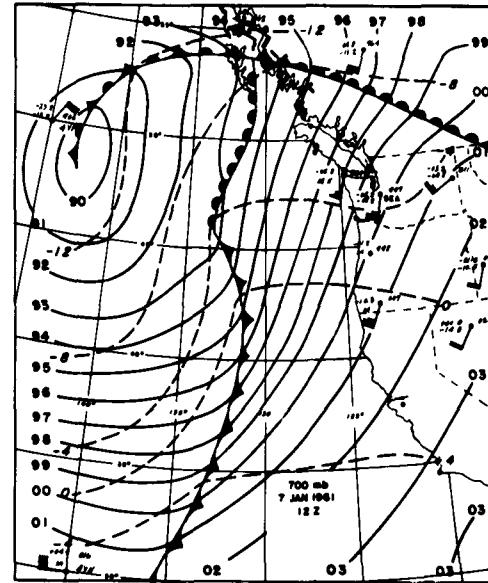
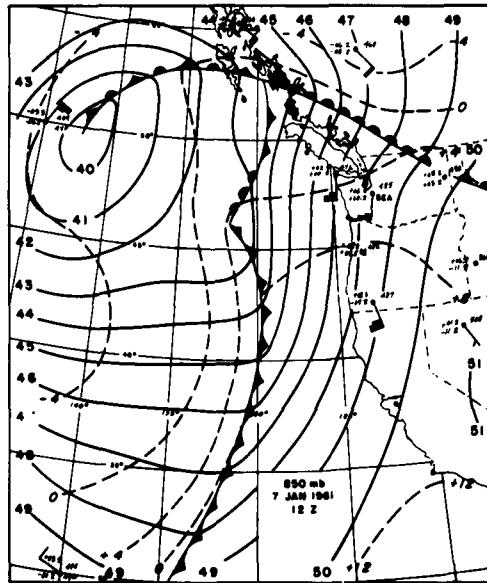


Fig. 7. Charts for 1200GCT January 7, 1961. Upper left, 850 mb; upper right, 700 mb; lower left, 250 mb; lower right, frontal contours.

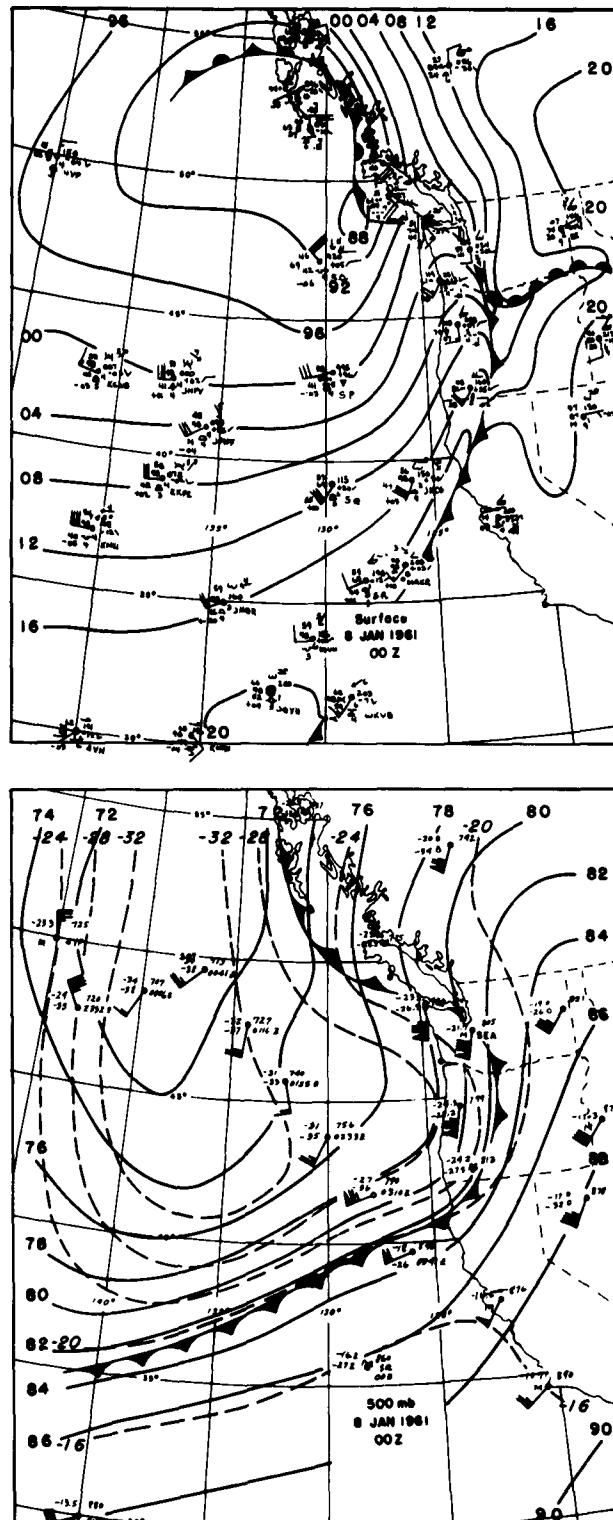


Fig. 8. Charts for 0000GCT January 8, 1961. Upper, surface;
lower, 500 mb.

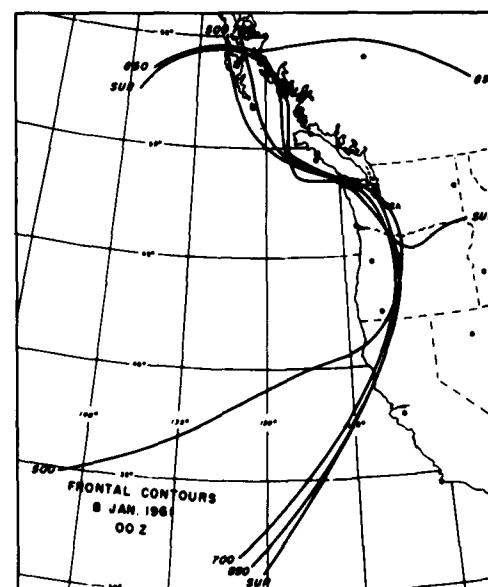
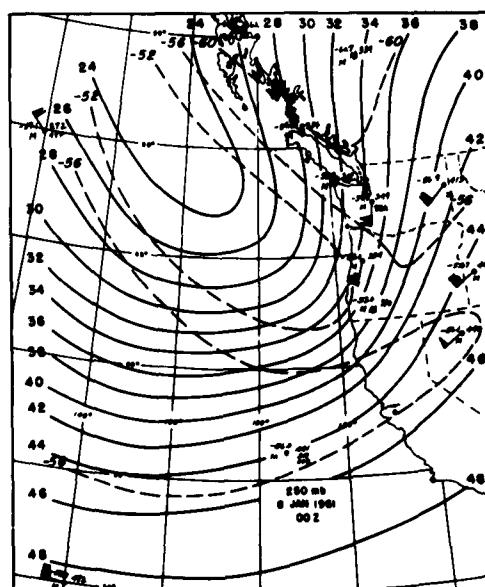
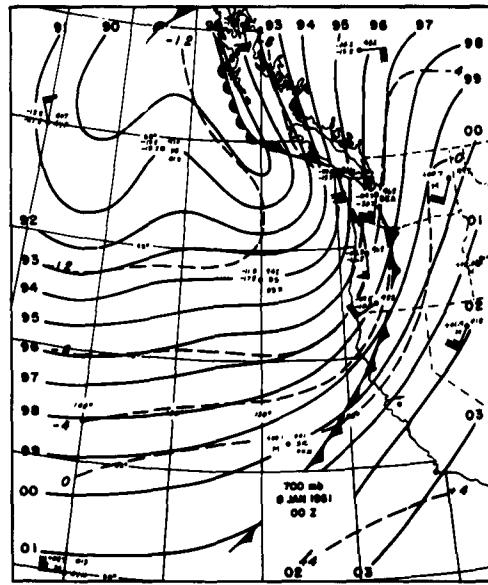
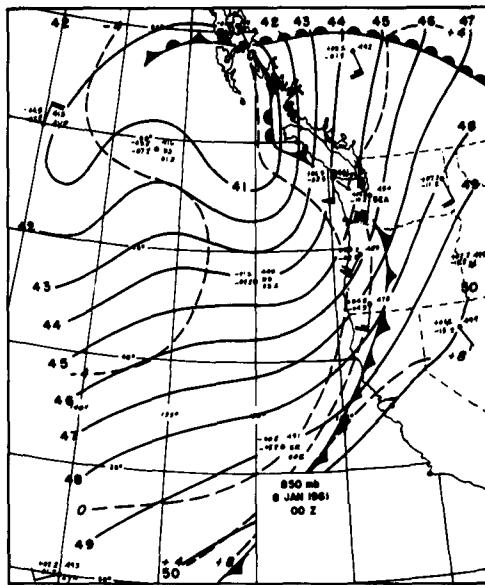


Fig. 9. Charts for 0000GCT January 8, 1961. Upper left, 850 mb; upper right, 700 mb; lower left, 250 mb; lower right, frontal contours.

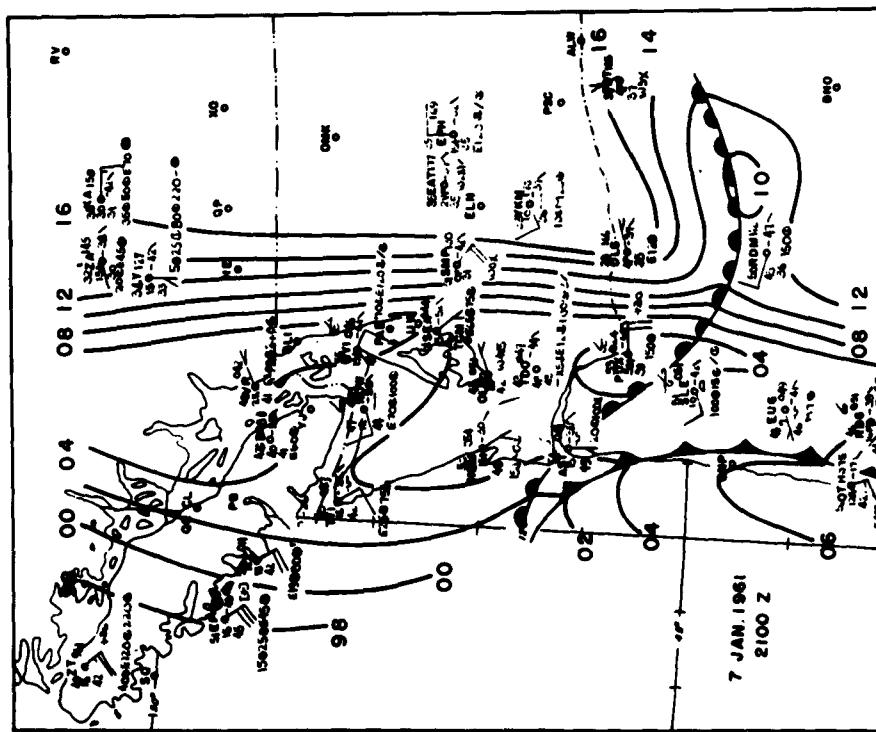
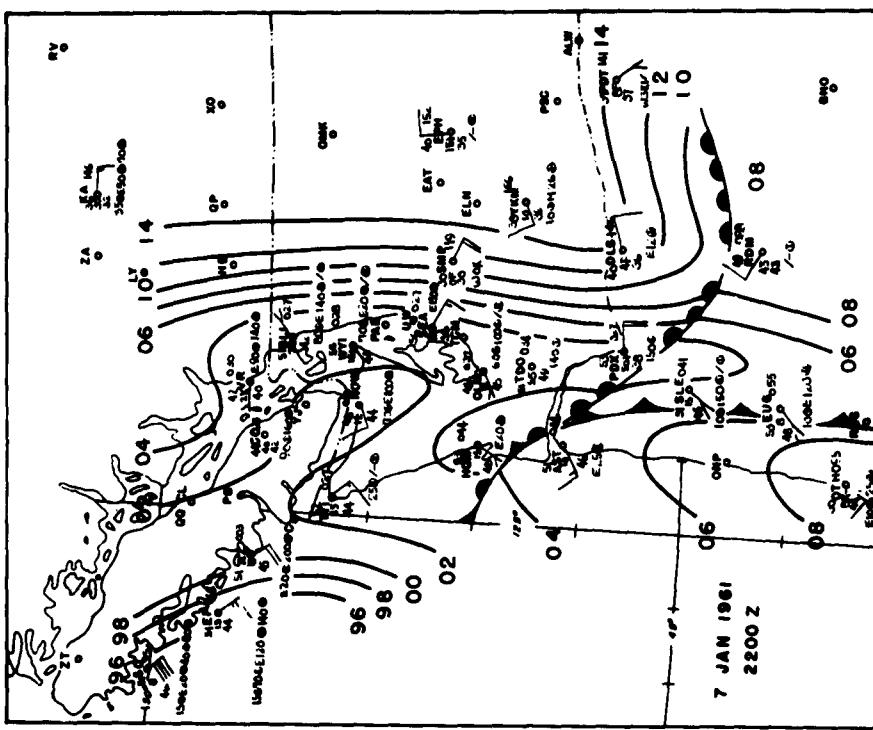


Fig. 10. Hourly sectional charts. (Part I)

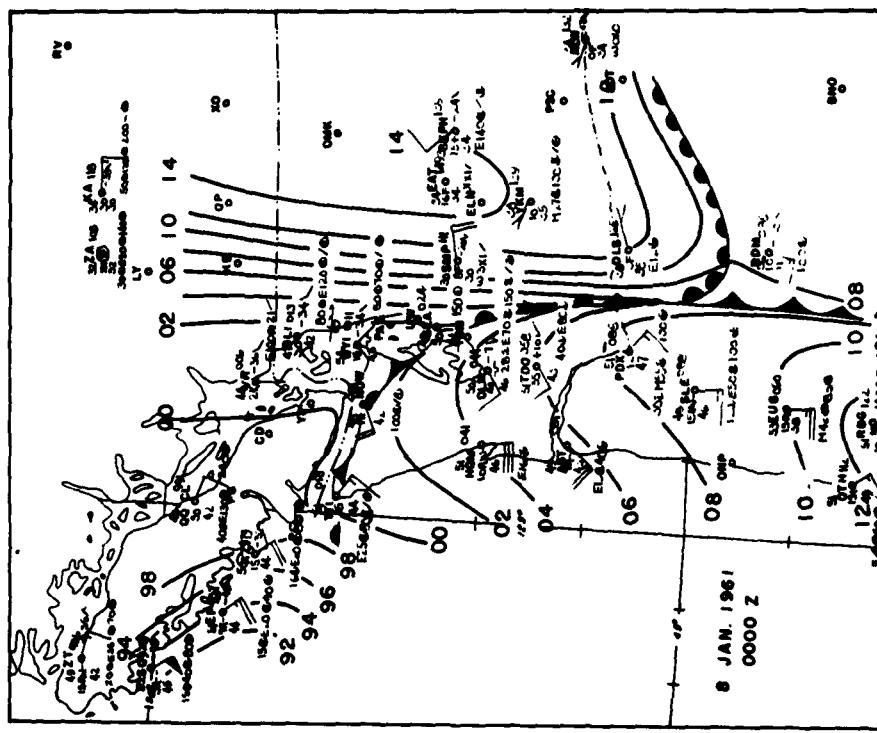
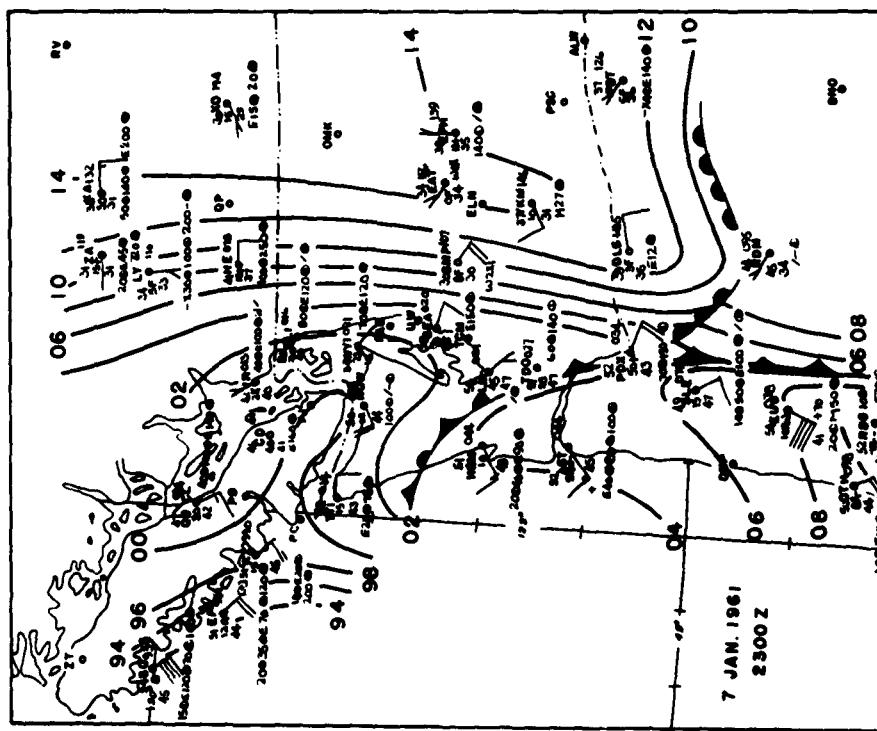


Fig. 10. (Part II)



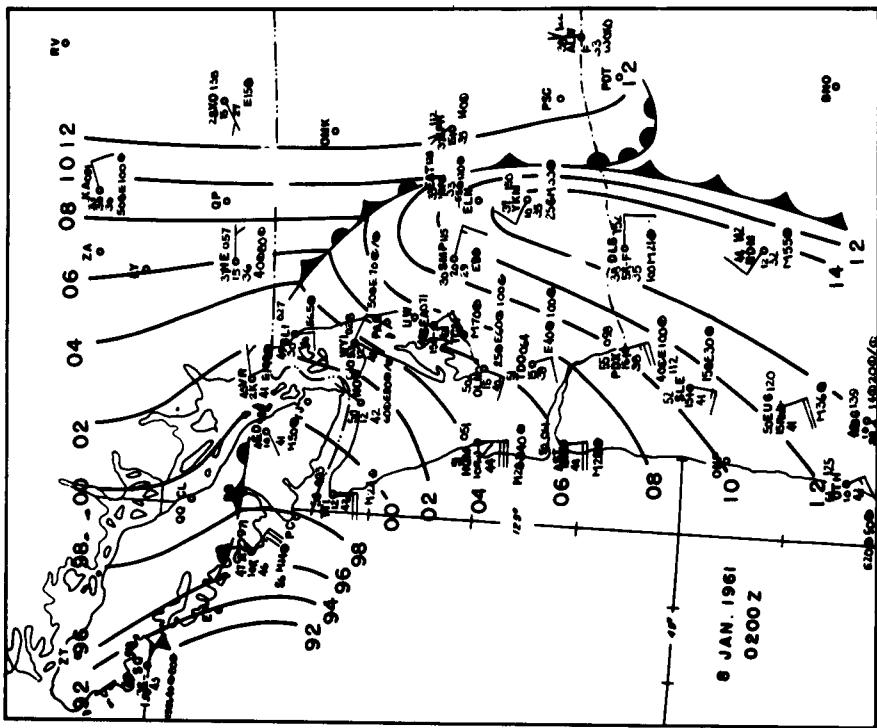
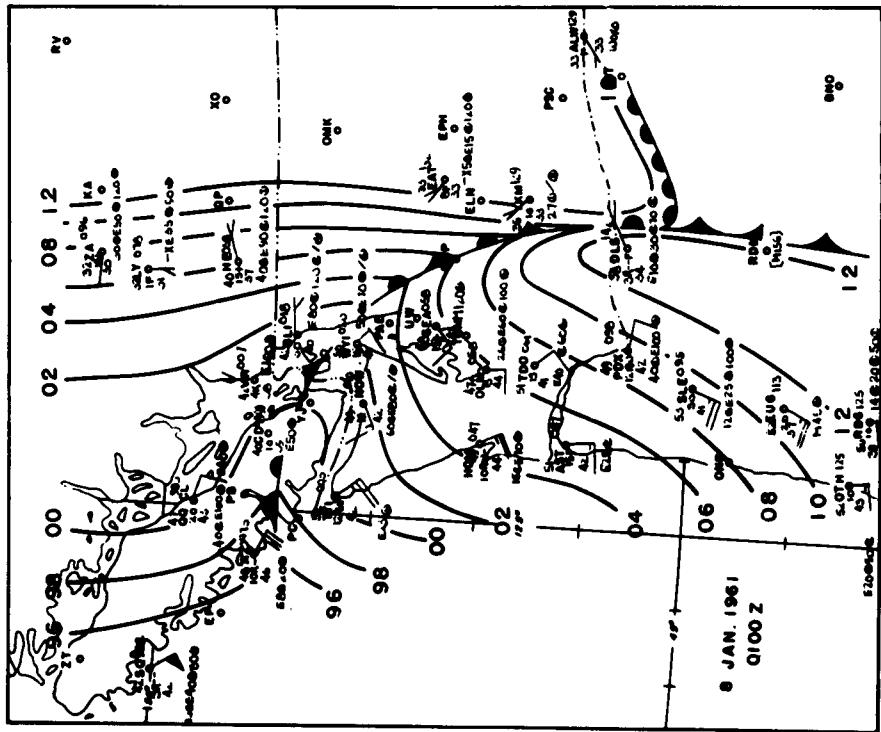


Fig. 10 (Part III)



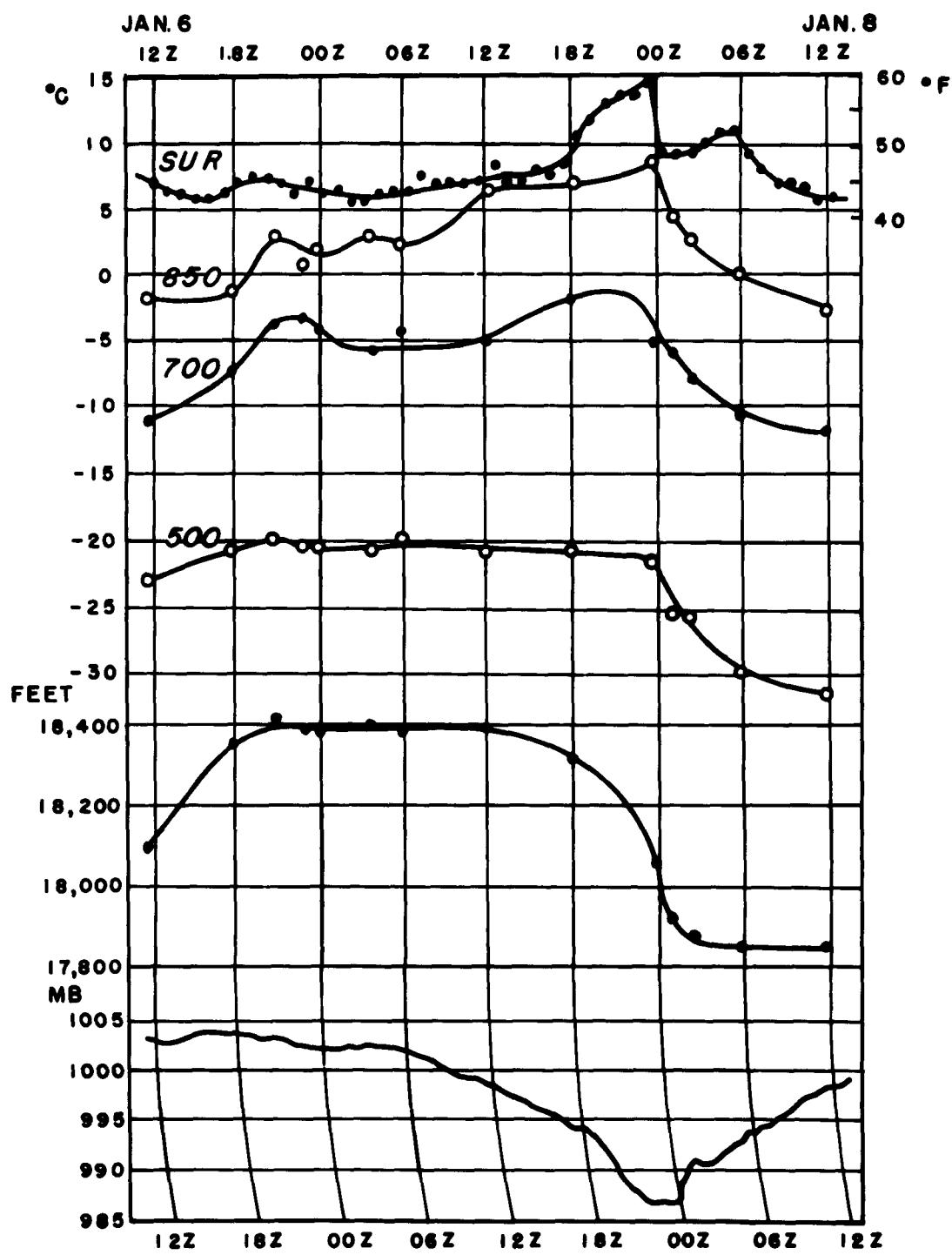


Fig. 11 Barograph trace for Seattle, and temperature traces at surface, 850 mb, 700 mb, and 500 mb, and height trace at 500 mb based on soundings released at Seattle-Tacoma Airport and the University of Washington.

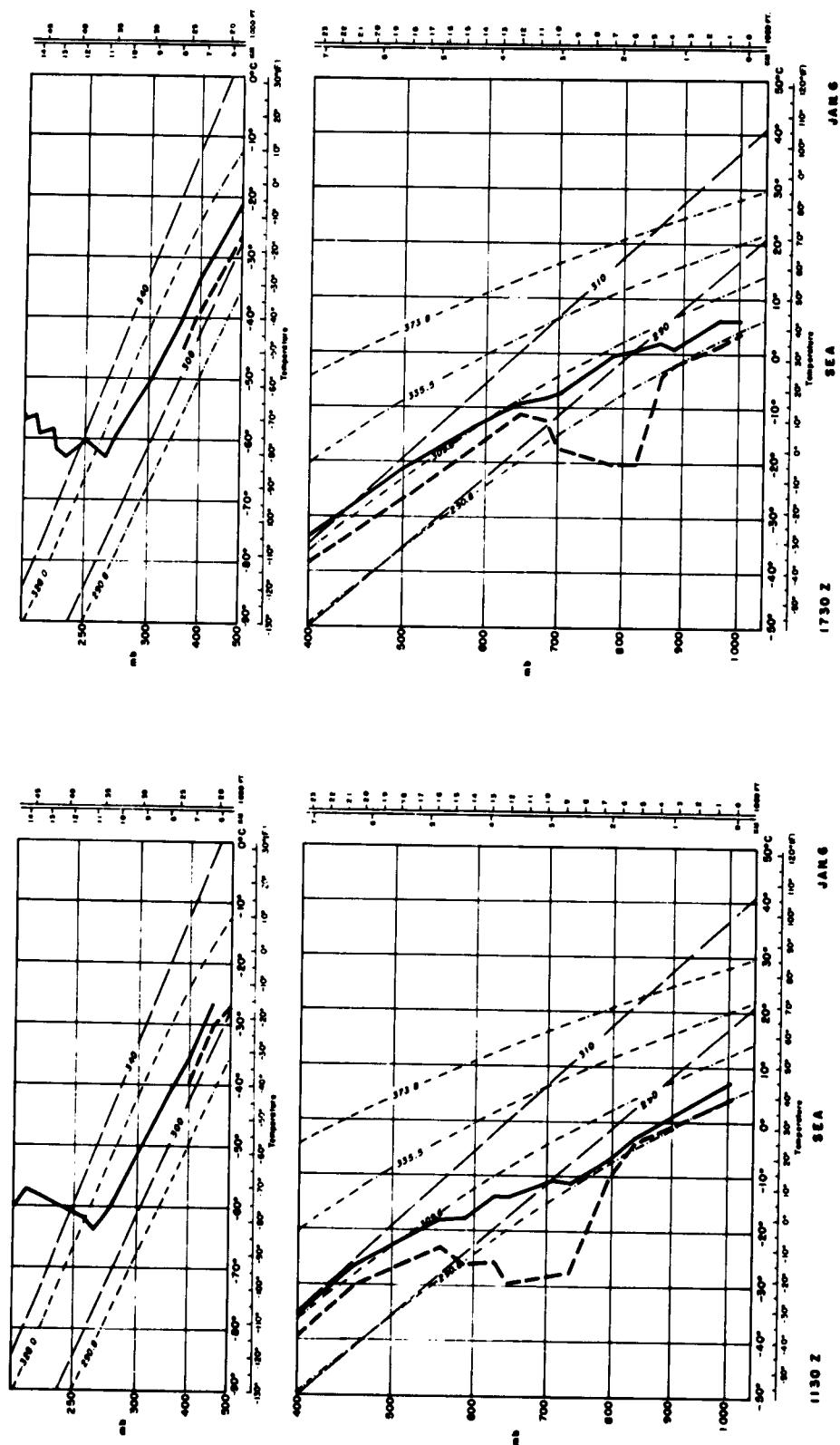


Fig. 12. Soundings, January 6-8, 1961. (Part I)

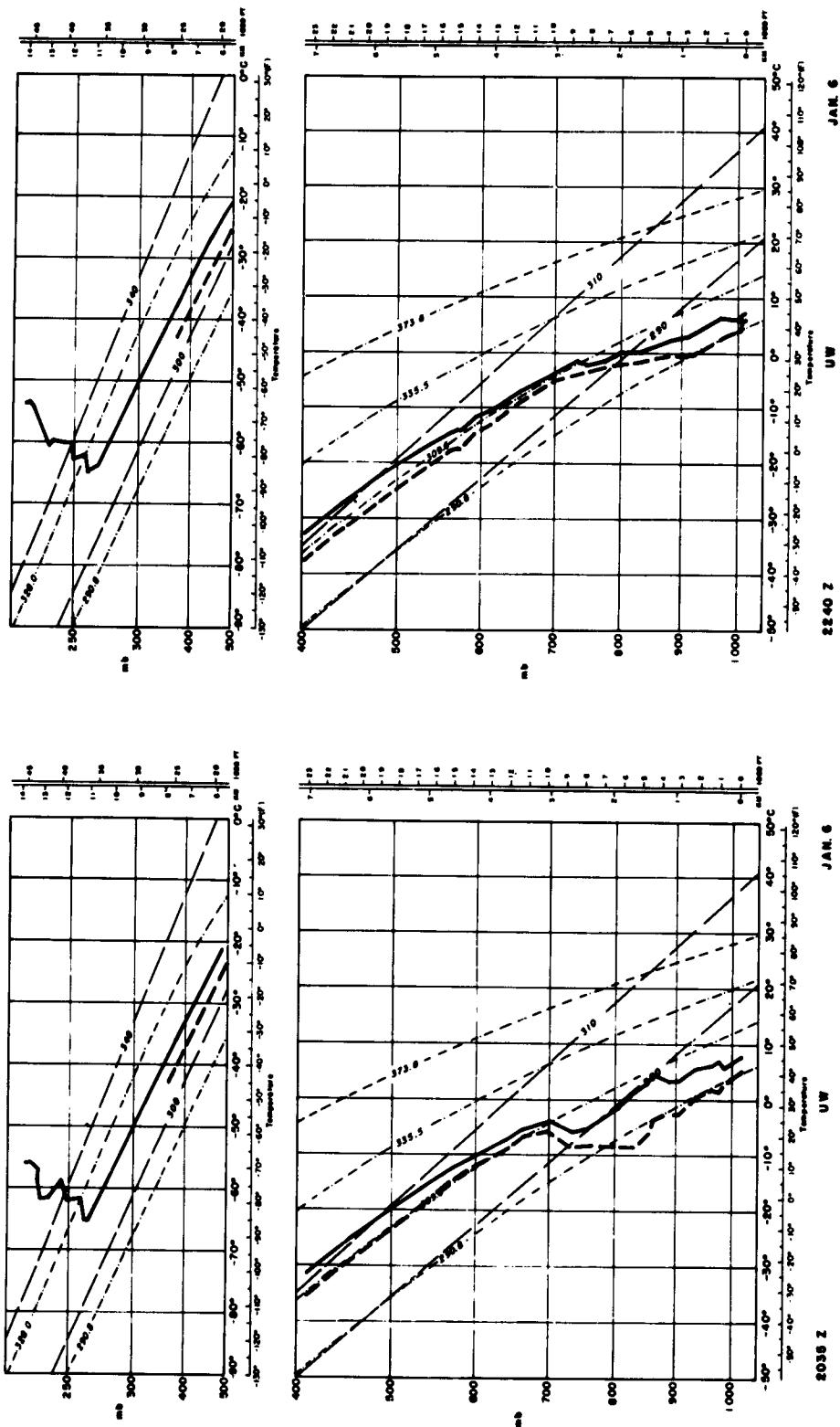


Fig. 12. (Part II)

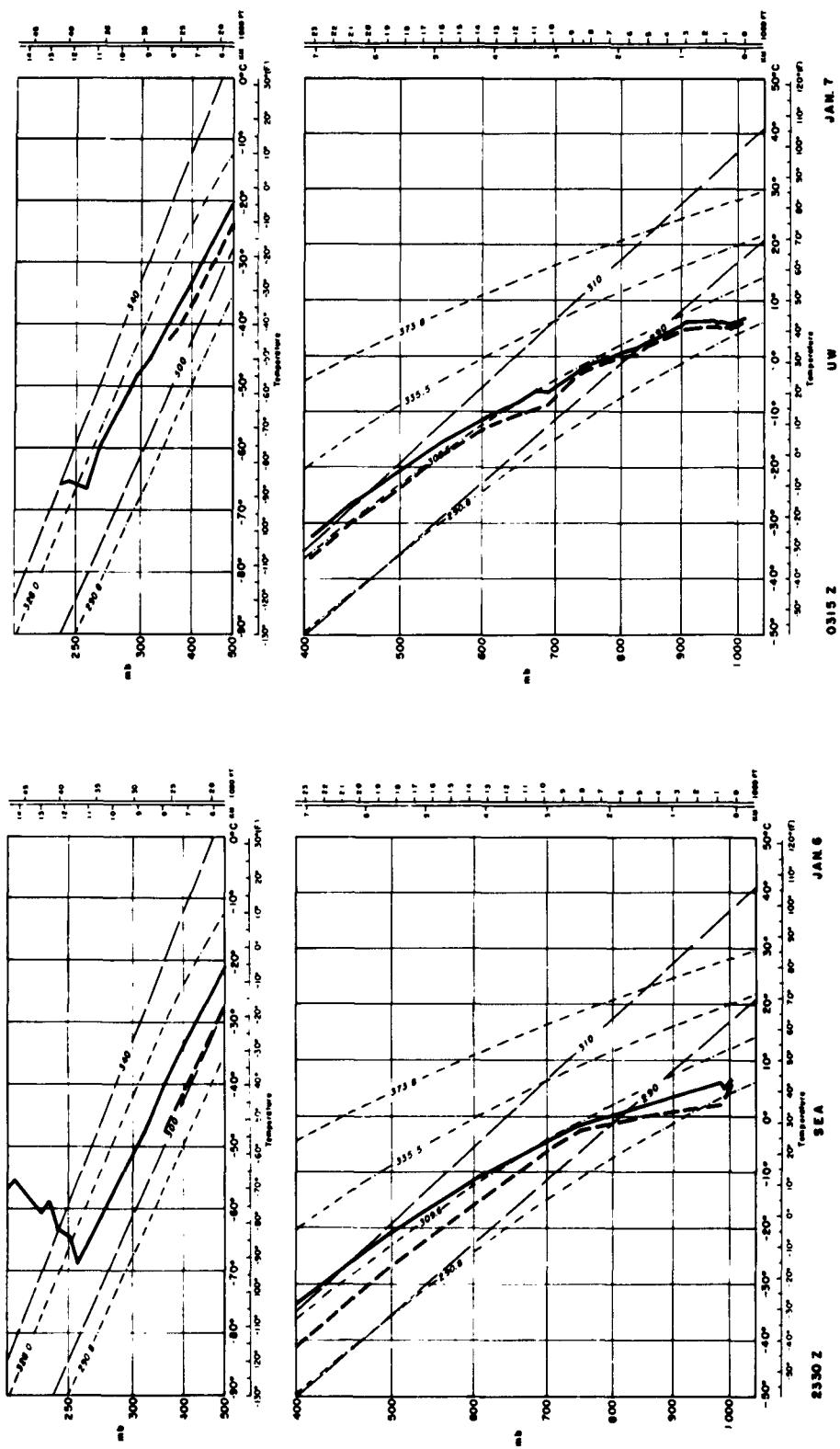


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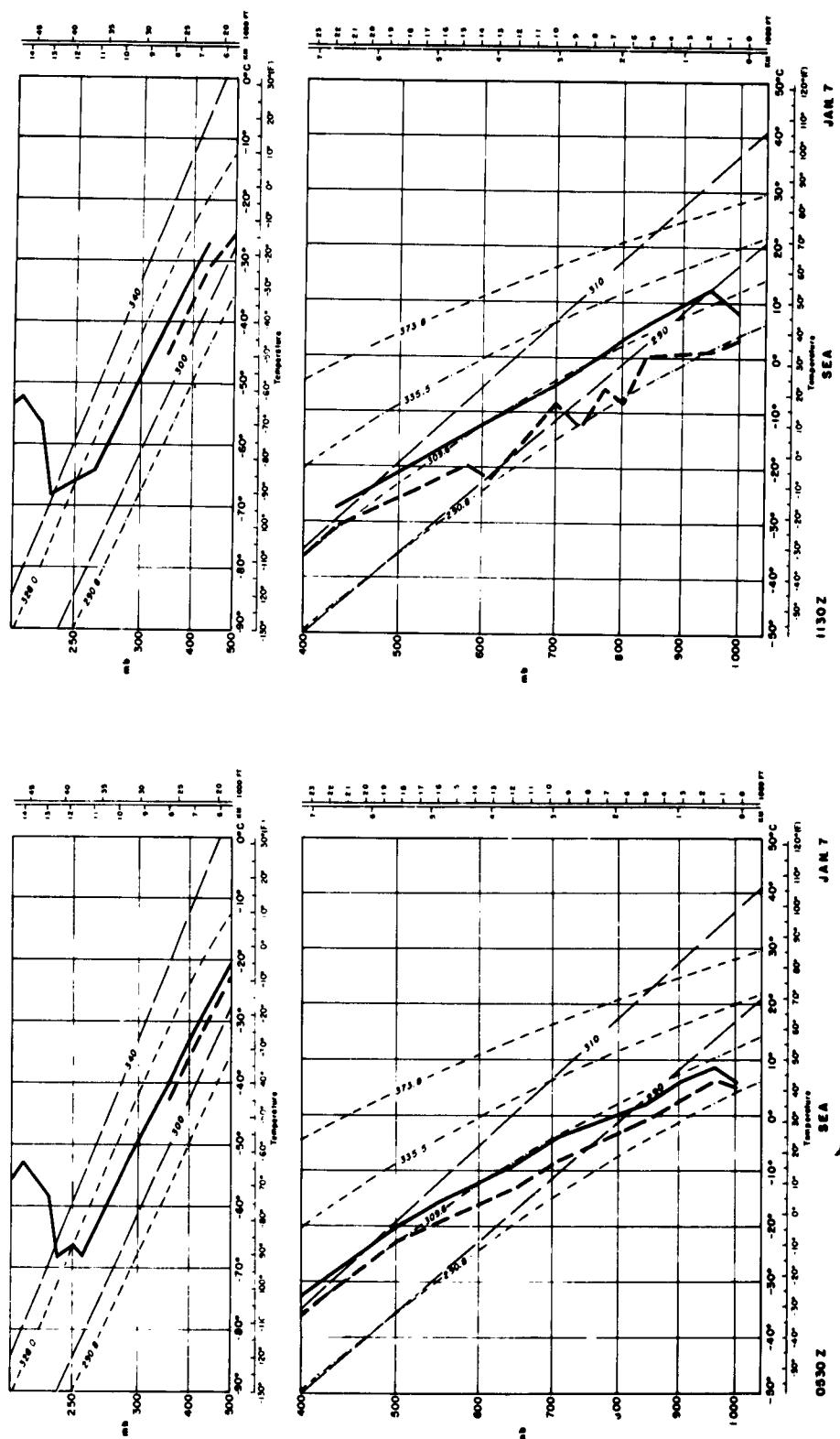


Fig. 12. (Part IV)

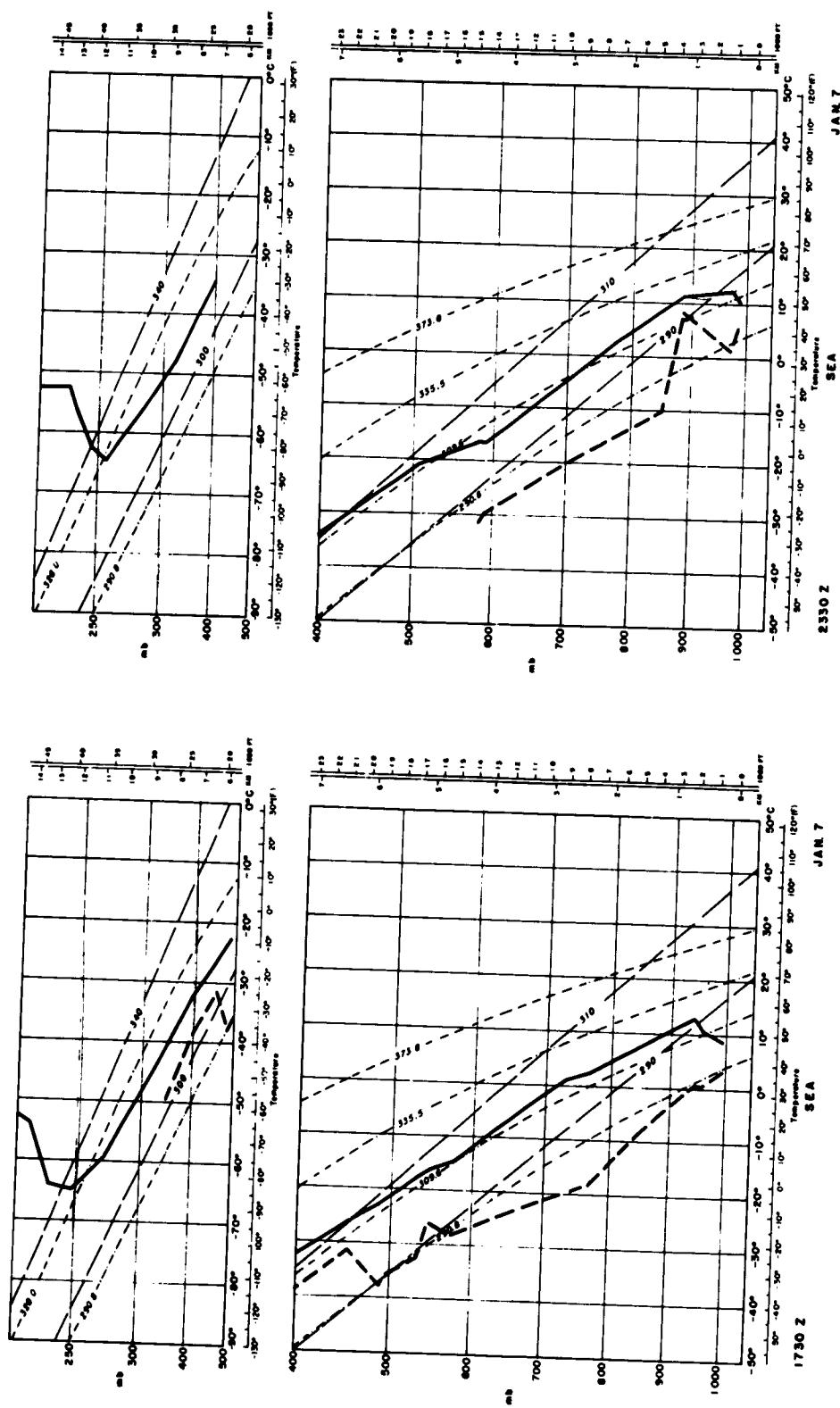


Fig. 12. (Part V)

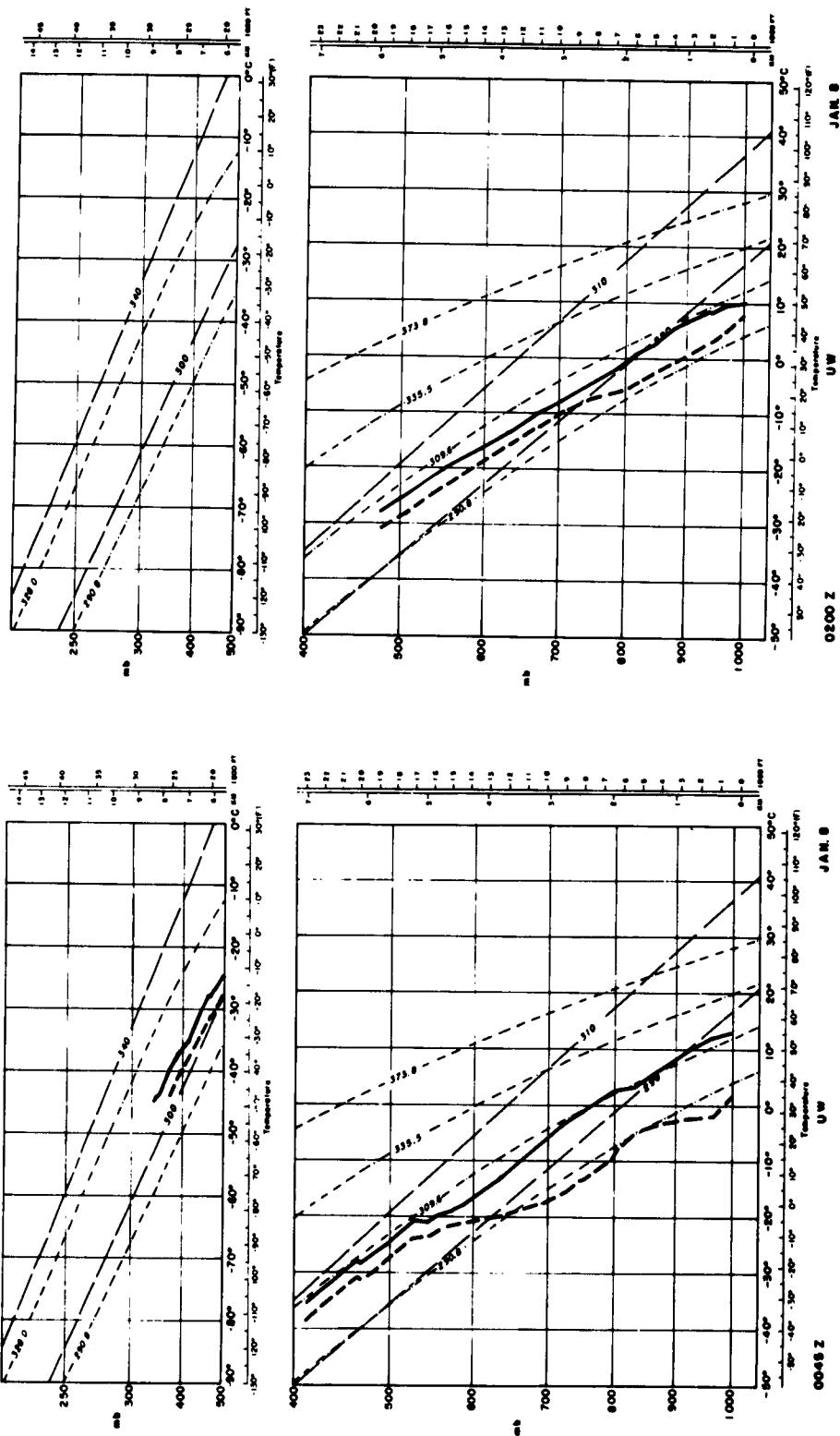


Fig. 12. (Part VI)

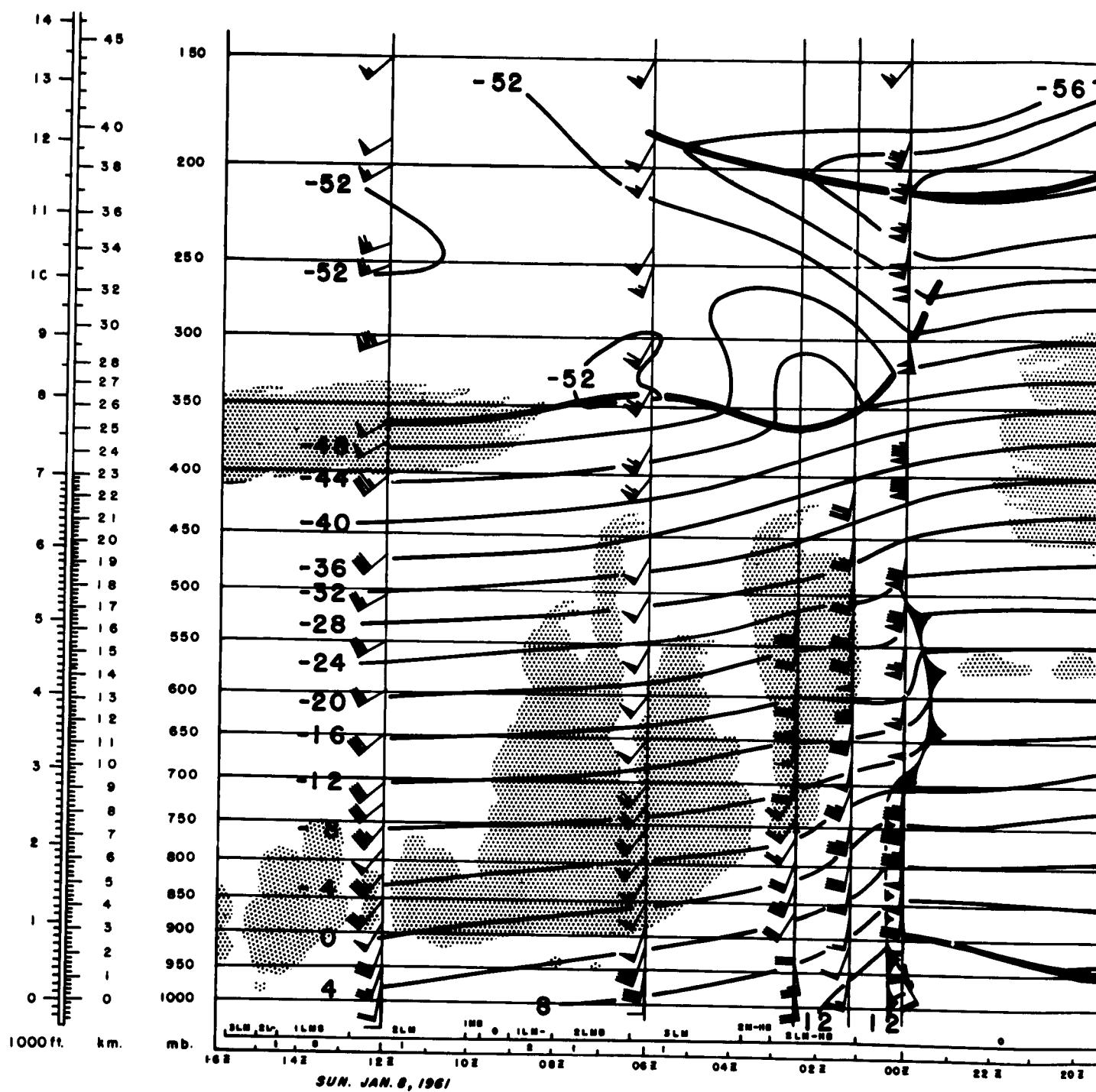
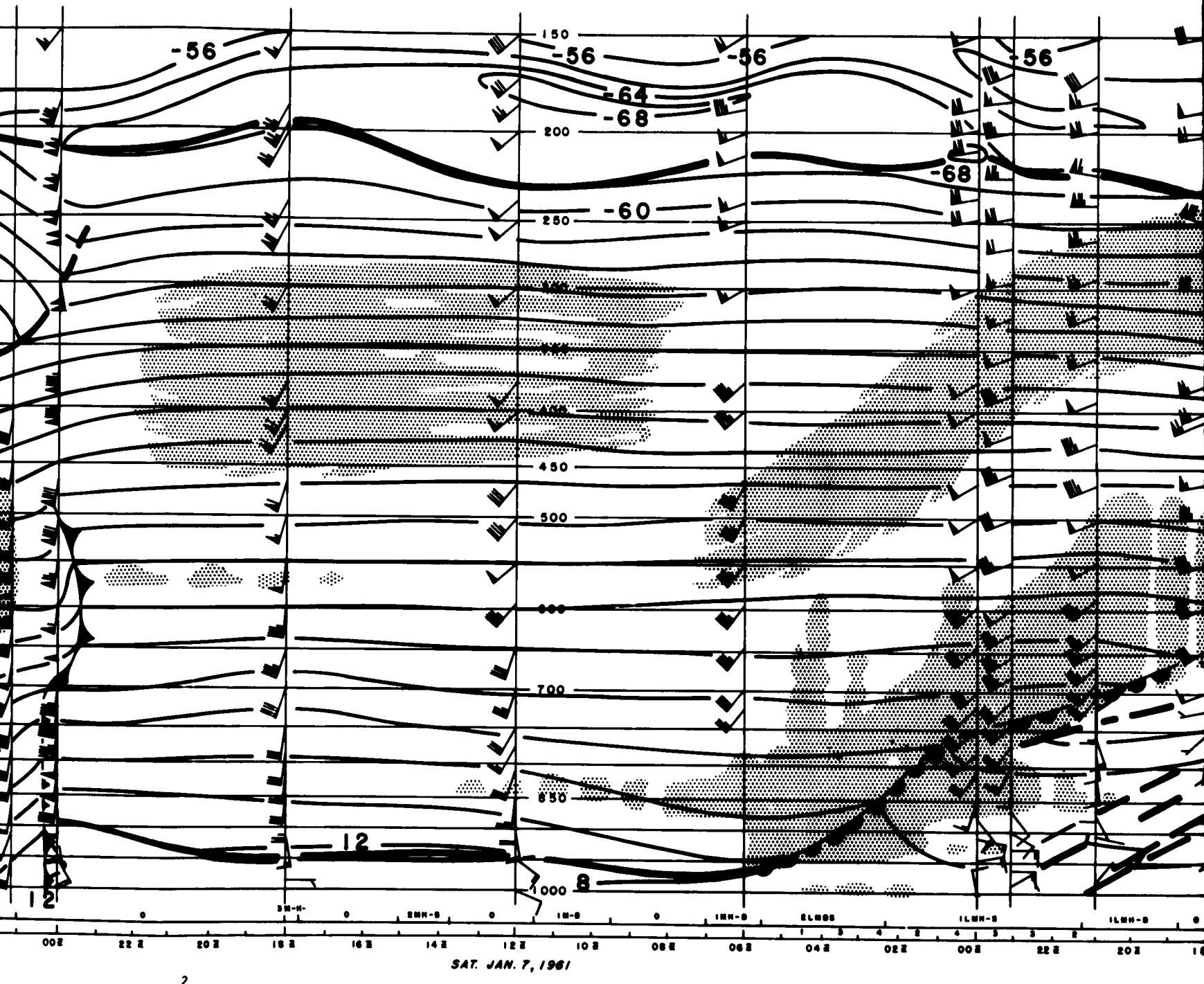


Fig. 13. Time section for Seattle, January 6-8, 1961. Winds denoted by usual convention hourly precipitation (in hundredths of an inch), and hourly surface observation

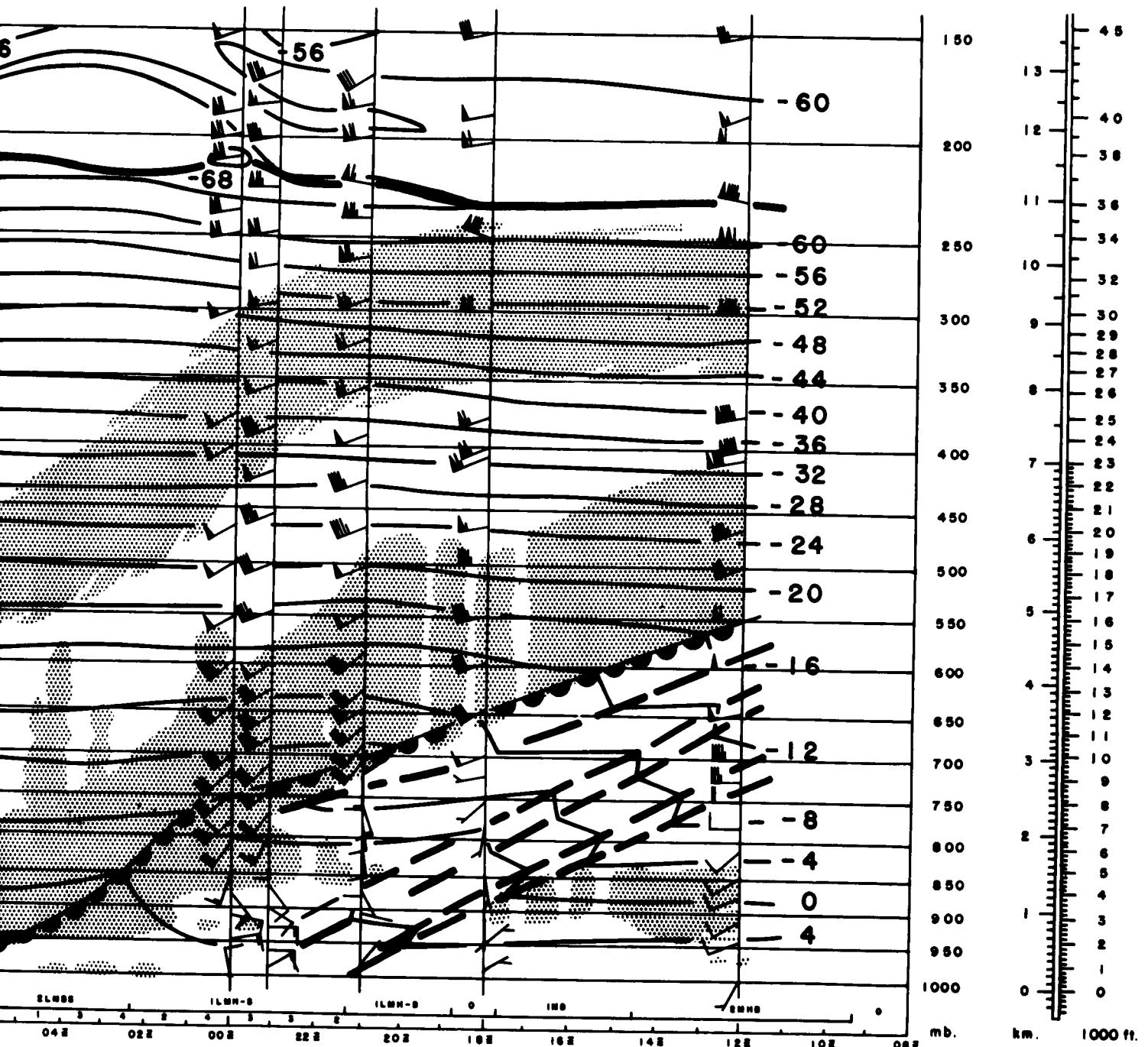


SAT. JAN. 7, 1961

48	058	50	024	52	027	53	044	55	064	53	071	51	088	47	112	45	115	44	122	44	129	44	135	44	146	44	156	44	166	44	173	44	186	44	196	44	206	44	216	44	226	44	236	44	246	44	256	44	266	44	276	44	286	44	296	44	306	44	316	44	326	44	336	44	346	44	356	44	366	44	376	44	386	44	396	44	406	44	416	44	426	44	436	44	446	44	456	44	466	44	476	44	486	44	496	44	506	44	516	44	526	44	536	44	546	44	556	44	566	44	576	44	586	44	596	44	606	44	616	44	626	44	636	44	646	44	656	44	666	44	676	44	686	44	696	44	706	44	716	44	726	44	736	44	746	44	756	44	766	44	776	44	786	44	796	44	806	44	816	44	826	44	836	44	846	44	856	44	866	44	876	44	886	44	896	44	906	44	916	44	926	44	936	44	946	44	956	44	966	44	976	44	986	44	996	44	1006	44
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oted by usual convention. Heavy lines represent frontal, inversion, or tropopause discontinuities; thin lines, isotherms. Surface observations are entered at bottom of section. Soundings are plotted at observation time (30 minutes apart).

2



opause discontinuities; thin lines, isotherms. Estimated cloud areas are stippled. Echo type, plotted at observation time (30 minutes after time of release).

JAN. 6



Fig. 14. Radar echoes January 6-8, 1961. Height scale to right in 1000's of feet, time scale below. (Part I)

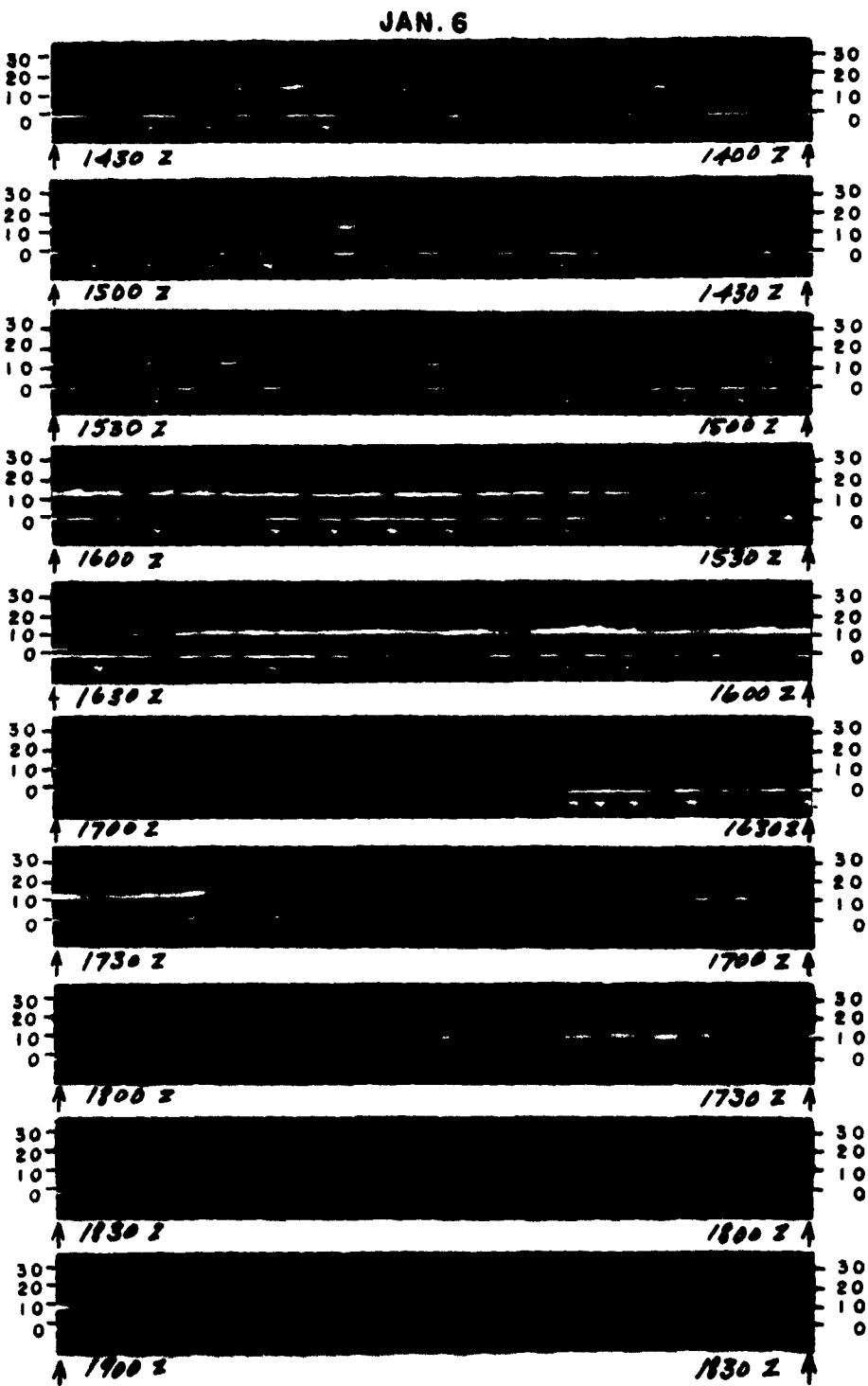


Fig. 14. (Part II)



Fig. 14. (Part III)

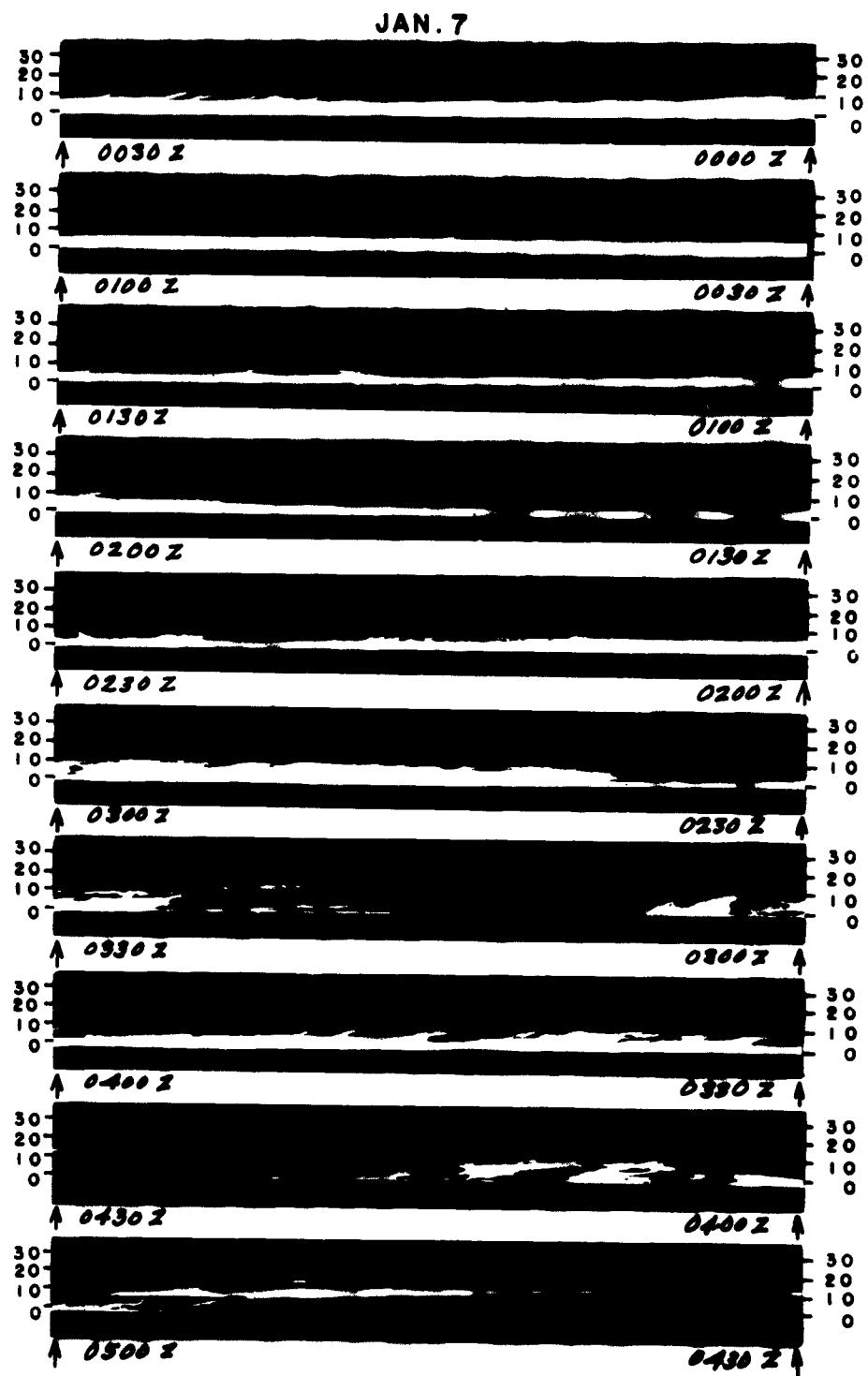
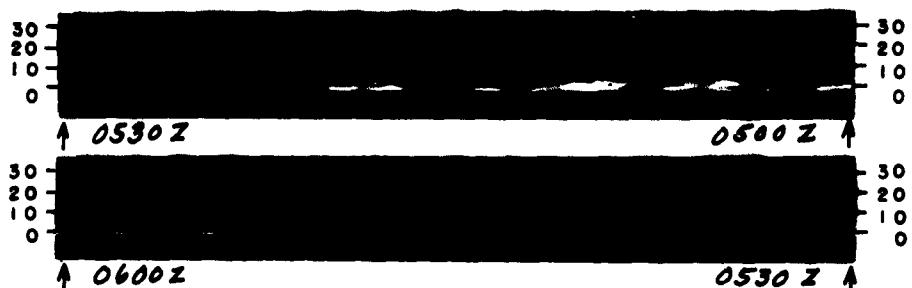


Fig. 14. (Part IV)

JAN. 7



ONLY A FEW INTERMEDIATE ECHOES WERE DETECTED
BETWEEN 0600 Z JAN. 7 AND 0050 Z JAN. 8

JAN. 8

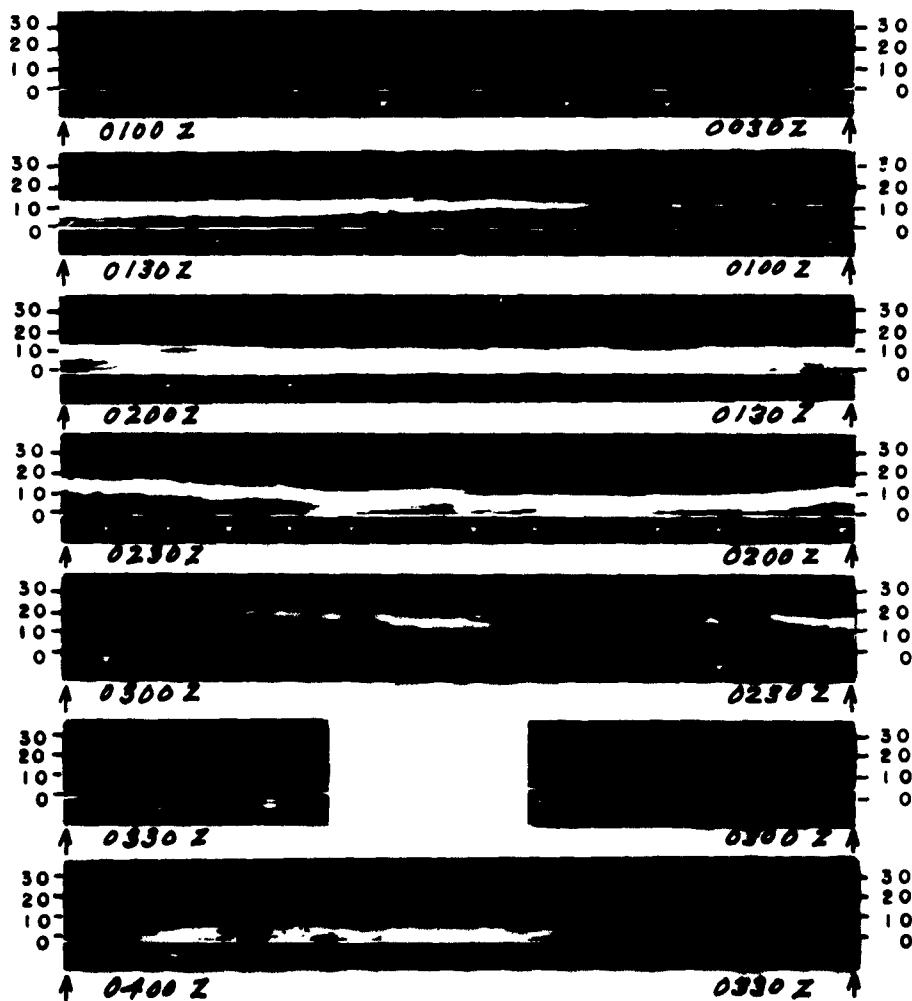


Fig. 14. (Part V)

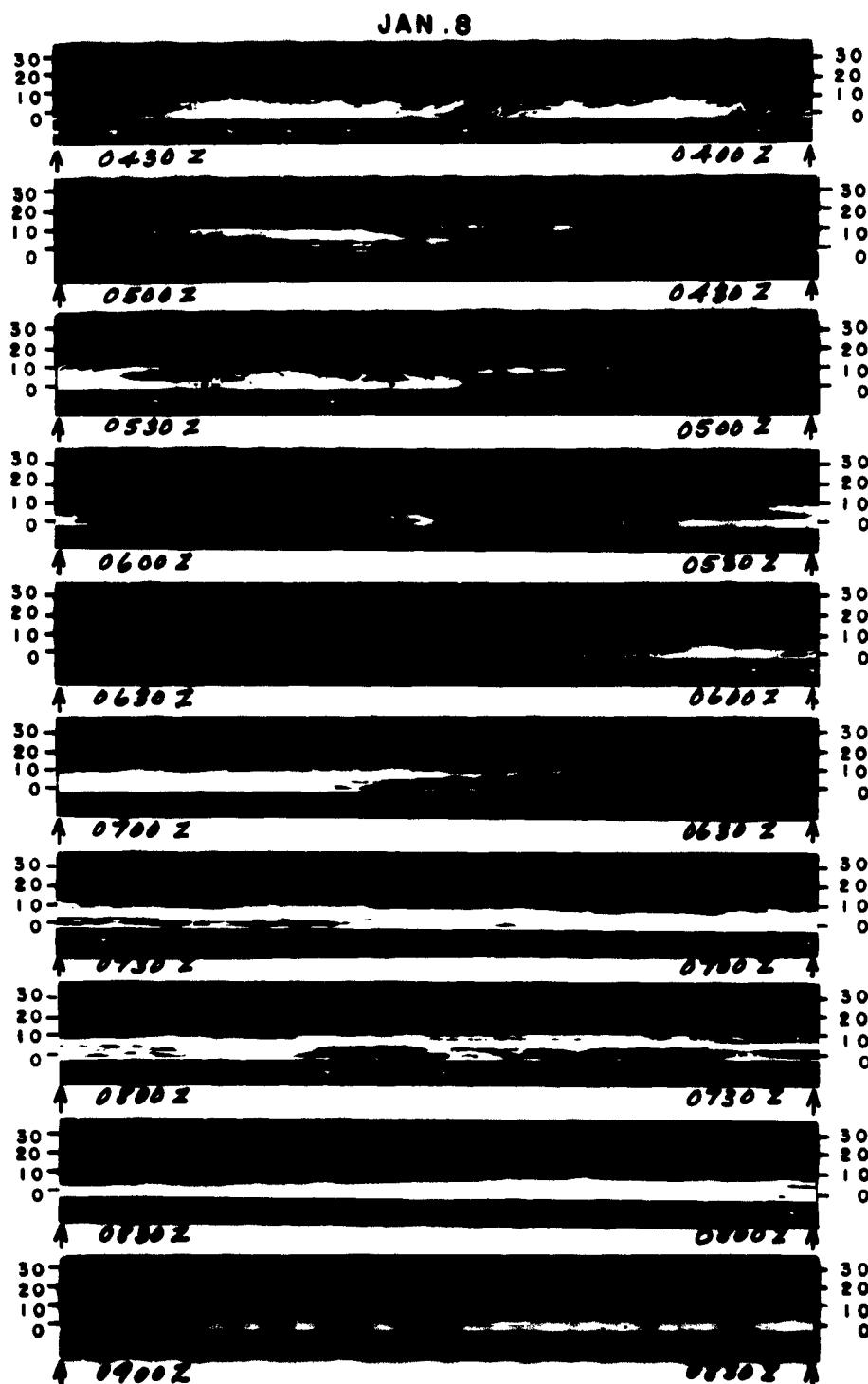


Fig. 14. (Part VI)

APPENDIX A

This section contains detailed sounding information as outlined in Section I-5. Notice that the sounding times in this section and in Figure 12 are the release times. Both the computer input and output data for these soundings are on punch cards which are available upon request.

The "1 MIN" winds for U.W. soundings give the mean rate of horizontal displacement of the balloon from 30 seconds before to 30 seconds after the indicated time of the wind. The SEA "2 MIN" wind is a similar mean over a two minute period. The "2 MIN RUN AV" winds were computed from the running mean formula

$$\overrightarrow{V}_2(M) = [\overrightarrow{V}_1(M-1) + 2 \overrightarrow{V}_1(M) + \overrightarrow{V}_1(M+1)] / 4$$

where \overrightarrow{V}_2 is the "2 MIN RUN AV" and the \overrightarrow{V}_1 is the "1 MIN" wind for U.W. data and the "2 MIN" wind for the SEA data. The indices refer to the level, for instance (M-1) is the level below level (M) - 30 seconds below for U.W. data and one minute below for SEA data. The "4 MIN RUN AV" wind was obtained in both cases from the "2 MIN RUN AV" data according to a similar relation,

$$\overrightarrow{V}_4(M) = [\overrightarrow{V}_2(M-2) + \overrightarrow{V}_2(M) + \overrightarrow{V}_2(M+2)] / 4$$

where \overrightarrow{V}_4 is the "4 MIN RUN AV."

SEA 6 JANUARY 1961 1130Z

TIME	PRES	RH	TEMP	DP	HEIGHT	2 MIN	2 MIN	4 MIN	DEG KNOT				
MIN	MB	%	°C	°C	FT	MSL	DEG	AV	RUN	AV	AV	AV	AV
0	1004	83	7.2	4.5	410	-0	-0	-0	-0	-0	-0	-0	-0
1	985	83	6.2	3.7	899	195	13	-0	-0	-0	-0	-0	-0
2	960	85	4.7	2.4	1610	229	10	220	11	-0	-0	-0	-0
3	934	86	3.2	1.2	2323	236	10	234	10	-0	-0	-0	-0
4	908	87	1.7	-0.1	3091	236	11	235	10	229	10	-0	-0
5	874	89	-0.4	-1.8	4078	234	10	231	9	233	9	-0	-0
6	842	91	-2.4	-3.6	5068	220	8	225	8	238	9	-0	-0
7	816	85	-4.7	-6.7	5883	228	7	236	7	248	9	-0	-0
8	792	75	-6.9	-10.6	6654	269	8	264	9	259	13	-0	-0
9	768	54	-8.6	-16.4	7426	274	15	270	16	265	19	-0	-0
10	744	32	-10.4	-24.5	8239	265	27	266	26	266	27	-0	-0
11	720	19	-10.7	-31.1	9066	265	37	266	37	266	34	-0	-0
12	696	17	-11.1	-32.7	9899	268	45	267	44	265	41	-0	-0
13	674	20	-12.2	-31.6	10713	266	50	265	48	264	45	-0	-0
14	653	23	-13.3	-30.8	11530	261	50	262	49	263	47	-0	-0
15	631	33	-13.5	-26.9	12359	259	46	260	47	263	48	-0	-0
16	609	41	-15.3	-25.9	13237	262	46	263	47	264	49	-0	-0
17	588	48	-17.5	-26.1	14118	267	48	267	49	265	52	-0	-0
18	567	58	-17.8	-24.0	15009	271	54	269	54	264	57	-0	-0
19	546	65	-18.7	-23.7	15912	266	60	265	62	262	65	-0	-0
20	526	66	-20.4	-25.0	16821	259	74	259	75	258	73	-0	-0
21	496	69	-23.0	-27.1	18237	254	92	254	88	255	80	-0	-0
22	467	71	-25.7	-29.4	19719	250	97	250	92	252	82	-0	-0
23	445	71	-28.4	-32.0	20851	247	83	248	81	251	81	-0	-0
24	439	71	-29.2	-32.9	21147	248	62	249	69	251	79	-0	-0
25	434	70	-30.1	-33.7	21449	253	70	253	73	254	79	-0	-0
26	422	70	-31.9	-35.6	22084	255	88	256	84	256	82	-0	-0
27	406	69	-34.4	-38.1	22956	260	91	260	89	259	87	-0	-0
28	391	67	-36.4	-40.5	23828	263	88	262	91	260	90	-0	-0
29	376	66	-38.7	-42.8	24697	261	99	262	95	261	94	-0	-0
30	362	62	-40.8	-45.4	25967	261	97	261	96	262	96	-0	-0
31	348	55	-43.0	-48.6	26455	261	90	261	96	262	98	-0	-0
32	334	47	-45.2	-52.0	27367	261	108	262	103	263	100	-0	-0
33	320	40	-47.5	-55.6	28282	264	103	264	103	264	101	-0	-0
34	306	32	-49.7	-59.5	29220	266	97	266	99	266	104	-0	-0
35	293	25	-52.0	-63.8	30164	268	98	267	102	267	108	-0	-0
36	279	17	-54.5	-69.1	31164	268	115	269	116	269	110	-0	-0
37	266	8	-57.0	-76.7	32223	270	136	271	125	272	108	-0	-0
38	253	0	-59.4	-96.1	33220	274	113	276	109	274	101	-0	-0
39	242	0	-61.5	-0.	34121	281	77	280	83	277	90	-0	-0
40	231	0	-62.8	-0.	35026	285	65	285	70	279	80	-0	-0
41	221	0	-62.6	-0.	35978	283	74	282	71	277	73	-0	-0
42	211	0	-61.2	-0.	36946	279	72	276	71	273	70	-0	-0
43	201	0	-60.7	-0.	37898	263	70	265	71	264	68	-0	-0
44	192	0	-60.1	-0.	38850	254	75	256	73	261	66	-0	-0
45	182	0	-59.6	-0.	39872	259	71	254	65	258	60	-0	-0
46	172	0	-58.9	-0.	41039	256	43	256	50	-0	-0	-0	-0
47	163	0	-58.3	-0.	42184	259	44	259	40	-0	-0	-0	-0
48	155	0	-57.8	-0.	43164	262	30	-0	-0	-0	-0	-0	-0
49	147	0	-57.3	-0.	44299	-0	-0	-0	-0	-0	-0	-0	-0

SEA 6 JANUARY 1961 1730Z

TIME	PRES	RH	TEMP	DP	HEIGHT	2 MIN	2 MIN	4 MIN	DEG KNOT				
MIN	MB	%	°C	°C	FT	MSL	DEG	AV	RUN	AV	AV	AV	AV
0	1005	86	6.1	3.9	410	-0	-0	-0	-0	-0	-0	-0	-0
1	973	76	6.1	2.2	1274	148	7	-0	-0	-0	-0	-0	-0
2	942	75	4.8	0.8	2125	59	2	136	3	-0	-0	-0	-0
3	913	77	2.9	-0.6	2970	177	4	172	4	-0	-0	-0	-0
4	885	79	1.2	-2.0	3795	181	9	178	8	169	6	-0	-0
5	858	58	1.8	-5.8	4626	170	8	171	7	171	6	-0	-0
6	830	29	0.7	-16.2	5503	154	5	163	5	172	5	-0	-0
7	802	20	-0.1	-21.7	6403	170	3	170	3	179	4	-0	-0
8	774	23	-1.0	-20.7	7333	194	3	193	2	211	3	-0	-0
9	745	31	-1.8	-18.8	8323	261	1	251	2	236	6	-0	-0
10	717	39	-6.0	-18.0	9306	269	6	253	8	243	13	-0	-0
11	692	60	-7.6	-14.1	10213	242	20	242	20	244	21	-0	-0
12	668	78	-8.4	-11.5	11126	238	36	241	34	249	30	-0	-0
13	644	85	-9.3	-11.2	12039	245	44	249	42	246	38	-0	-0
14	621	85	-10.8	-12.9	12956	249	44	249	45	249	43	-0	-0
15	599	84	-12.4	-14.5	13872	250	46	252	46	252	45	-0	-0
16	577	82	-14.0	-16.4	14785	256	49	256	47	255	45	-0	-0
17	557	77	-15.9	-19.0	15700	260	46	259	46	259	45	-0	-0
18	536	72	-17.8	-21.6	16621	261	43	262	44	262	45	-0	-0
19	516	67	-19.7	-24.3	17545	265	42	263	43	264	46	-0	-0
20	496	63	-21.7	-27.0	18514	271	46	269	47	265	48	-0	-0
21	475	63	-24.1	-29.3	19530	268	52	266	52	262	51	-0	-0
22	456	63	-26.5	-31.5	20526	260	57	260	56	258	55	-0	-0
23	438	63	-20.8	-33.6	21475	252	60	252	60	254	59	-0	-0
24	420	63	-31.1	-35.8	22427	247	64	248	64	251	63	-0	-0
25	403	63	-33.5	-38.1	23434	247	68	248	67	250	66	-0	-0
26	385	62	-36.1	-40.8	24443	250	69	250	69	251	67	-0	-0
27	369	60	-38.7	-43.6	25409	253	68	252	67	252	67	-0	-0
28	354	52	-41.3	-47.4	26371	253	64	254	65	254	66	-0	-0
29	339	39	-43.7	-52.4	27284	255	63	256	64	257	66	-0	-0
30	326	26	-46.0	-58.1	28164	259	67	259	65	259	67	-0	-0
31	313	13	-48.4	-66.2	29066	263	64	262	67	262	68	-0	-0
32	299	0	-50.9	-0.	30045	264	74	265	72	265	71	-0	-0
33	285	0	-53.1	-0.	31027	268	78	268	75	268	74	-0	-0
34	272	0	-55.2	-0.	32002	272	70	271	75	270	76	-0	-0
35	260	0	-57.3	-0.	32981	271	81	272	78	273	78	-0	-0
36	248	0	-59.5	-0.	33969	276	82	276	82	275	78	-0	-0
37	236	0	-61.6	-0.</td									

W 2240Z JANUARY 6, 1961

SEA 6 JANUARY 1961 2330Z

TIME	PRES	RH	TEMP	DP	HEIGHT	1 MIN	2 MIN	4 MIN	TIME	PRES	RH	TEMP	DP	HEIGHT	2 MIN	2 MIN	4 MIN
MIN	MB	%	°C	°C	FT MSL	DEG KNOT	DEG KNOT	DEG KNOT	MIN	MB	%	°C	°C	FT MSL	DEG KNOT	DEG KNOT	DEG KNOT
0	1017	92	7.6	6.4	36				0	1003	93	6.7	5.6	410	-0	-0	-0
0.5	1009	87	6.2	4.2	262	27	6	60	1	978	78	6.0	2.4	1083	125	10	-0
1.0	993	82	6.0	3.1	692	57	9	60	2	947	80	5.1	1.9	1947	100	12	108
1.5	977	77	6.7	2.9	1129	80	13	65	3	917	81	4.2	1.3	2814	110	12	116
2.0	960	74	5.8	1.8	1602	87	15	66	4	888	83	3.3	0.8	3666	142	10	148
2.5	945	74	4.8	0.5	2024	86	15	66	5	860	85	2.4	0.2	4523	187	16	188
3.0	930	74	3.7	-0.2	2504	86	14	66	6	833	87	1.5	-0.4	5369	207	26	208
3.5	915	78	2.6	-1.4	2973	97	12	68	7	806	88	0.7	-1.0	6210	221	32	221
4.0	900	80	1.7	-0.4	3444	101	11	65	8	781	90	-0.2	-1.5	7055	292	36	229
4.5	885	82	2.4	-0.6	3892	139	11	65	9	756	92	-1.0	-2.1	7901	232	38	229
5.0	865	84	1.7	-0.7	4378	144	12	67	10	732	90	-2.2	-3.6	8751	230	39	230
5.5	850	86	0.7	-1.4	4841	166	13	66	11	708	86	-3.8	-5.7	9610	229	40	229
6.0	835	89	0.4	-1.4	5310	182	17	64	12	684	82	-5.3	-7.8	10498	228	39	229
6.5	818	89	0.3	-1.3	5852	199	21	69	13	661	78	-6.9	-10.0	11381	228	37	228
7.0	803	90	0.1	-1.3	6339	210	26	70	14	638	74	-8.5	-12.2	12279	229	40	231
7.5	770	92	-0.8	-0.8	6768	211	29	72	15	616	70	-10.0	-14.5	13180	232	44	232
8.0	774	91	-1.4	-0.8	7224	221	31	75	16	594	67	-11.9	-16.7	14115	236	47	236
8.5	758	91	-1.7	-0.7	7851	225	33	75	17	571	65	-13.8	-19.0	15066	239	48	237
9.0	745	90	-2.0	-0.4	8303	225	37	76	18	551	63	-15.7	-21.2	15983	238	51	239
9.5	729	90	-2.1	-0.5	8870	230	40	70	19	532	61	-17.4	-23.2	16847	239	51	240
10.0	715	90	-2.4	-0.8	9376	234	42	73	20	513	59	-19.2	-25.2	17713	242	49	241
10.5	699	89	-3.5	-0.1	9965	234	44	75	21	494	57	-21.2	-27.6	18668	242	52	242
11.0	682	88	-4.8	-0.5	10489	236	47	76	22	474	55	-23.7	-30.2	19635	242	52	242
11.5	667	87	-5.7	-0.5	11061	238	48	78	23	455	53	-26.1	-32.9	20591	242	47	241
12.0	652	85	-6.8	-0.8	11542	239	47	79	24	438	51	-28.5	-35.5	21541	240	48	241
12.5	642	85	-7.7	-0.7	12056	240	45	80	25	420	50	-30.9	-38.1	22462	240	49	242
13.0	629	83	-8.7	-1.1	12471	242	46	80	26	404	48	-33.1	-40.6	23384	241	46	242
13.5	615	82	-10.0	-1.5	12849	240	50	80	27	389	46	-35.4	-43.0	24287	247	42	245
14.0	599	79	-10.9	-1.3	13915	242	48	82	28	373	45	-37.8	-45.6	25202	245	47	245
14.5	586	78	-12.7	-1.8	14467	244	48	84	29	358	42	-40.2	-48.4	26121	243	49	244
15.0	573	76	-13.8	-1.7	15028	245	50	84	30	344	27	-42.7	-54.6	27039	246	47	246
15.5	563	75	-14.2	-1.7	15467	249	47	85	31	330	13	-45.2	-63.7	27955	249	49	248
16.0	550	72	-15.3	-1.9	16093	249	46	85	32	316	0	-47.6	-60	28871	250	51	250
16.5	536	72	-16.6	-2.0	16686	248	43	83	33	303	0	-50.0	-60	29785	252	54	253
17.0	525	72	-17.8	-2.0	17276	248	42	83	34	290	0	-52.4	-60	30701	255	53	253
17.5	514	72	-18.9	-2.7	17745	249	43	84	35	278	0	-54.7	-60	31575	255	55	254
18.0	501	69	-20.2	-2.5	18240	247	40	84	36	267	0	-56.9	-60	32432	253	62	254
18.5	490	68	-21.4	-2.6	18678	246	38	84	37	256	0	-59.1	-60	33305	252	67	255
19.0	479	67	-22.7	-2.7	19427	246	43	85	38	245	0	-61.4	-60	34241	254	70	257
19.5	467	66	-24.2	-3.0	20036	245	45	84	39	234	0	-63.7	-60	35178	261	68	260
20.0	459	66	-25.4	-3.0	20500	247	50	84	40	222	0	-66.2	-60	36196	263	76	263
20.5	446	65	-26.5	-3.1	21131	248	50	84	41	211	0	-68.7	-60	37224	265	71	264
21.0	436	65	-27.6	-3.1	21759	253	43	82	42	201	0	-70.2	-60	38165	263	50	260
21.5	421	64	-29.4	-3.5	22493	253	48	82	43	192	0	-73.6	-60	39103	251	68	257
22.0	412	63	-31.7	-3.6	22991	251	50	81	44	183	0	-76.5	-60	40072	253	76	254
22.5	403	63	-32.7	-3.9	23503	249	47	81	45	174	0	-79.2	-60	41095	260	46	256
23.0	395	62	-34.2	-4.0	23965	247	51	81	46	165	0	-82.2	-60	42136	250	32	251
23.5	387	62	-35.5	-4.0	24433	250	45	81	47	158	0	-85.0	-60	43048	241	41	244
24.0	379	61	-36.6	-4.1	24909	251	43	80	48	151	0	-87.8	-60	43940	246	43	0
24.5	372	60	-37.7	-4.2	25332	249	50	80	49	145	0	-90.7	-60	44848	-0	-0	-0
25.0	363	60	-38.7	-4.3	25823	248	49	80	50								-0
25.5	348	59	-40.3	-4.7	26262	249	46	79	51								-0
26.0	340	59	-43.1	-4.7	27280	249	48	79	52								-0
26.5	333	59	-44.2	-4.8	27803	247	52	77	53								-0
27.0	325	59	-45.5	-4.8	28337	247	55	75	54								-0
27.5	319	59	-47.0	-4.8	28812	250	53	75	52								-0
28.0	311	59	-48.1	-4.8	29394	253	48	74	51								-0
28.5	303	59	-49.7	-4.8	29856	257	55	75	53								-0
29.0	295	59	-50.7	-4.8	30429	259	55	75	55								-0
29.5	283	59	-52.5	-4.8	30957	258	55	75	56								-0
30.0	275	59	-55.3	-4.8	31514	256	62	75	56								-0
30.5	268	59	-56.4	-4.8	32043	256	62	75	57								-0
31.0	263	59	-57.6	-4.8	32543	256	63	75	58								-0
31.5	257	59	-58.1	-4.8	32844	256	63	75	60								-0
32.0	251	59	-58.8	-4.8	33220	256	63	75	63								-0
32.5	246	59	-59.8	-4.8	33806	259	63	75	65								-0
33.0	240	59	-61.5	-4.8	34218	262	75	75	61								-0
33.5	235	59	-62.5	-4.8	34720	260	72	75	61								-0
34.0	230	59	-64.2	-4.8	35146	261	64	75	65								-0
34.5	225	59	-64.3	-4.8	35657	260	64	75	65								-0
35.0	223	59	-64.7	-4.8	36199	269	64	75	65								-0
35.5	217	59	-65.3	-4.8	36747	269	65	75	66								-0
36.0	211	59	-66.1	-4.8	37314	271	61	69	63								-0
36.5	206	59	-67.2	-4.8	37801	265	32	64	61								-0

UW 0315Z JANUARY 7, 1961

TIME	PRES	RH	TEMP	DP	HEIGHT
MIN	MB	%	°C	°C	FT MSL
0	1016	97	7.0	6.6	35
0.5	976	95	6.2	5.9	55
1.0	976	93	6.8	5.6	141
1.5	956	92	6.3	5.1	1700
2.0	940	92	6.3	5.1	2155
2.5	918	93	6.2	5.2	2793
3.0	900	94	5.6	4.7	3326
3.5	881	95	4.8	4.1	3899
4.0	864	95	3.9	3.2	4420
4.5	844	95	3.0	2.3	4982
5.0	829	95	1.9	1.4	531
5.5	813	95	0.3	-0.3	6037
6.0	798	96	-0.3	-0.7	6861
6.5	775	97	-0.3	-0.7	7299
7.0	754	97	-1.4	-1.8	8020
7.5	739	96	-2.2	-2.8	8545
8.0	723	93	-3.7	-4.7	9115
8.5	707	88	-5.0	-6.7	9694
9.0	695	85	-5.5	-8.0	10358
9.5	679	78	-6.0	-9.3	11308
10.0	664	63	-6.9	-9.3	11931
10.5	648	55	-8.2	-10.3	12486
11.0	634	57	-8.7	-10.5	13055
11.5	620	58	-9.5	-11.1	13550
12.0	608	58	-10.7	-12.3	14222
12.5	592	58	-11.7	-13.3	14824
13.0	588	57	-12.5	-14.2	15393
13.5	585	55	-13.9	-15.9	15933
14.0	581	53	-15.3	-17.7	16453
14.5	537	52	-16.8	-19.2	17350
15.0	522	78	-18.3	-21.2	17918
15.5	510	77	-19.1	-22.7	18497
16.0	498	76	-20.8	-24.0	19087
16.5	486	74	-22.2	-25.6	19791
17.0	475	73	-23.6	-27.1	20407
17.5	465	72	-25.0	-28.5	21059
18.0	447	71	-26.4	-29.0	21639
18.5	435	71	-28.3	-32.0	22387
19.0	423	70	-29.9	-34.9	22833
19.5	415	70	-31.2	-36.7	23685
20.0	408	69	-32.3	-36.1	24209
20.5	400	69	-32.9	-36.7	24742
21.0	391	69	-34.7	-39.5	25223
21.5	382	68	-35.7	-39.6	25897
22.0	374	68	-37.0	-40.0	26560
22.5	366	70	-38.3	-41.8	27211
23.0	368	70	-39.2	-42.7	27845
23.5	352	-	-40.3	-45.0	28590
24.0	345	-	-41.3	-47.0	27038
24.5	337	-	-42.7	-52.5	27559
25.0	330	-	-43.6	-52.3	28023
25.5	324	-	-44.4	-52.7	28427
26.0	317	-	-45.2	-52.2	28907
26.5	308	-	-46.0	-52.0	29524
27.0	301	-	-46.8	-51.8	29749
27.5	295	-	-47.6	-50.5	30355
28.0	290	-	-48.1	-50.7	30471
28.5	285	-	-49.2	-50.8	30840
29.0	280	-	-50.2	-51.4	31214
29.5	279	-	-51.2	-51.6	31668
30.0	273	-	-52.3	-52.1	32131
30.5	264	-	-54.1	-52.0	32840
31.0	254	-	-56.2	-53.8	33649
31.5	236	-	-59.7	-53.9	34398
32.0	220	-	-61.7	-55.9	35593
32.5	221	-	-64.0	-58.0	36503
33.0	216	-	-65.4	-59.6	36961
33.5	212	-	-66.3	-57.3	37334
34.0	207	-	-66.7	-58.8	37808
34.5	202	-	-65.9	-58.9	38294
35.0	195	-	-65.4	-58.9	38692
35.5	189	-	-66.3	-59.3	39203
36.0	188	-	-66.4	-59.7	39727
36.5	186	-	-65.6	-59.6	40156
37.0	180	-	-65.9	-59.9	40594

SEA 7 JANUARY 1961 0530Z

TIME	PRES	RH	TEMP	DP	HEIGHT	2 MIN	2 MIN	4 MIN
MIN	MB	%	°C	°C	FT MSL	DEG KNOT	DEG KNOT	DEG KNOT
						RUN AV	RUN AV	RUN AV
0	1003	93	6.1	5.1	410			
1	961	85	8.7	6.3	1563			
2	920	90	6.9	5.4	2733			
3	881	88	4.6	2.8	3909			
4	842	81	2.0	-0.8	5088			
5	806	79	0.5	-2.7	6273			
6	770	76	-1.1	-4.7	7467			
7	735	74	-2.6	-6.6	8670			
8	702	72	-4.3	-8.6	9871	220	37	
9	670	72	-6.9	-11.1	11072	220	40	220
10	639	73	-9.4	-13.3	12267	221	40	220
11	609	77	-11.4	-14.6	13465	217	42	217
12	579	81	-13.5	-16.1	14772	214	42	215
13	548	84	-15.6	-17.6	16098	213	40	213
14	519	83	-18.2	-20.4	17453	211	40	213
15	491	81	-20.9	-23.3	18791	209	40	210
16	465	79	-24.1	-26.7	20132	212	38	214
17	438	76	-27.5	-30.4	21559	223	41	223
18	411	74	-30.9	-34.1	23010	231	46	230
19	385	73	-34.8	-37.8	24508	235	48	233
20	361	75	-38.9	-41.6	25982	237	51	235
21	340	58	-42.4	-47.4	27362	237	55	236
22	320	38	-45.5	-54.2	28648	235	56	236
23	301	17	-48.9	-64.4	30013	236	59	237
24	282	0	-52.3	-60.	31378	240	55	241
25	266	0	-55.6	-60.	32651	248	49	245
26	250	0	-59.0	-60.	33927	245	52	242
27	234	0	-62.4	-60.	35206	239	53	243
28	219	0	-66.1	-60.	36595	242	52	244
29	204	0	-66.6	-60.	38012	256	59	252
30	190	0	-67.2	-60.	39400	254	52	252
31	177	0	-65.9	-60.	40748	243	56	243
32	166	0	-57.5	-60.	42104	235	58	236
33	156	0	-55.6	-60.	43427	233	59	0
34	146	0	-53.7	-60.	44745	-0	-0	-0

SEA 7 JANUARY 1961 1130Z

TIME	PRES	RH	TEMP	DP	HEIGHT	2 MIN	2 MIN	4 MIN
MIN	MB	%	°C	°C	FT MSL	DEG KNOT	DEG KNOT	DEG KNOT
						RUN AV	RUN AV	RUN AV
0	1000	71	8.3	3.3	410	-0	-0	-0
1	973	57	10.5	2.4	1133	133	29	-0
2	947	46	12.5	0.8	1878	132	12	138
3	922	51	11.0	0.9	2629	167	11	162
4	896	56	9.4	0.9	3413	176	19	178
5	869	61	7.8	0.6	4220	186	24	186
6	844	66	6.3	0.3	5029	195	26	194
7	819	53	4.7	-4.2	5830	201	29	199
8	795	46	3.0	-7.8	6626	205	32	204
9	771	59	0.8	-6.5	7423	205	32	204
10	748	50	-1.3	-10.6	8221	202	32	201
11	725	56	-3.1	-10.8	9020	199	32	199
12	703	74	-4.7	-8.6	9820	194	35	195
13	681	70	-6.2	-10.7	10640	195	38	196
14	659	61	-7.7	-13.9	11478	202	39	202
15	638	52	-9.2	-17.3	12319	211	39	210
16	618	44	-10.6	-20.9	13140	215	40	216
17	598	49	-12.2	-21.0	13947	222	43	221
18	579	60	-14.0	-20.2	14757	228	48	227
19	559	61	-15.7	-21.5	15632	228	49	227
20	538	63	-17.5	-22.9	16552	226	54	226
21	518	65	-19.3	-24.3	17476	225	53	224
22	501	66	-20.9	-25.6	18300	221	43	221
23	484	68	-22.5	-26.0	19128	217	40	219
24	468	69	-24.1	-28.1	19956	220	43	220
25	452	71	-25.7	-29.4	20777	223	44	222
26	437	72	-27.3	-30.7	21602	224	45	223
27	421	70	-29.3	-32.9	22430	225	46	225
28	407	68	-31.4	-35.4	23270	225	52	224
29	392	65	-33.5	-37.0	24111	222	55	222
30	377	62	-35.7	-40.4	24978	220	53	220
31	363	59	-37.9	-43.0	25884	218	53	221
32	348	56	-40.2	-45.7	26792	220	54	221
33	333	50	-42.8	-49.2	27777	223	56	223
34	318	44	-45.4	-52.9	28782	226	52	226
35	304	37	-48.1	-56.8</				

SEA 7 JANUARY 1961 1730Z

UN 00452 JANUARY 8, 1961

TIME	PRES	RH	TEMP	DP	HEIGHT	2 MIN	2 MIN	4 MIN	TIME	PRES	RH	TEMP	DP	HEIGHT	1 MIN	2 MIN	4 MIN
MIN	MB	%	°C	°C	FT	MSL	DEG KNOT	DEG KNOT	MIN	MB	%	°C	°C	FT	MSL	DEG KNOT	DEG KNOT
							RUN AV	RUN AV								RUN AV	RUN AV
0	995	68	8.9	3.2	410	-0	-0	-0	0	996	47	13.4	1.8	110	97	23	188 23
1	965	53	10.2	1.0	1242	133	26	-0	-0	951	38	12.9	-1.2	1439	183	23	198 19
2	935	42	12.6	-0.6	2086	135	17	142	19	929	43	10.3	-2.0	2080	191	20	193 20
3	905	38	10.9	-3.5	2998	169	19	167	19	907	46	10.0	-2.5	2730	201	22	198 19
4	874	34	9.1	-6.6	3927	185	25	183	24	176	23	9.0	-3.4	3307	195	16	193 19
5	846	30	7.5	-9.7	4810	190	28	188	27	184	26	4.0	-4.2	4610	192	16	193 20
6	820	27	5.9	-12.8	5648	186	28	187	29	189	29	4.0	-5.1	5816	187	26	187 25
7	795	23	4.3	-16.0	6488	185	30	189	30	192	31	4.0	-6.0	5900	184	37	188 35
8	770	20	2.7	-19.6	7346	197	34	196	34	195	34	5.0	-7.8	1940	182	42	187 40
9	745	16	1.7	-23.4	8209	202	38	200	37	198	37	6.0	-9.6	1973	188	44	189 42
10	720	15	0.1	-25.4	9128	200	41	200	41	199	40	7.0	-10.5	1976	193	46	192 45
11	693	19	-2.3	-24.2	10126	200	45	200	44	199	43	7.5	-11.4	9300	194	45	193 45
12	666	23	-4.8	-24.0	11130	199	46	198	46	197	45	8.0	-12.3	9225	194	47	194 48
13	640	25	-7.4	-25.2	12150	195	47	195	47	195	47	9.0	-13.2	10636	193	54	193 51
14	615	27	-10.0	-26.5	13169	191	47	192	47	193	48	9.5	-14.1	1947	197	47	187 46
15	591	28	-12.6	-28.0	14169	191	48	191	49	192	49	10.0	-15.0	1976	193	46	193 47
16	568	33	-14.7	-28.1	15171	191	52	191	51	192	50	11.0	-16.9	9300	195	45	194 48
17	547	41	-15.9	-26.4	16089	192	52	193	52	193	51	12.0	-17.8	9225	194	47	193 48
18	527	25	-17.9	-34.2	17000	195	51	194	51	194	51	12.5	-18.7	11324	193	54	193 51
19	508	25	-20.2	-35.9	17922	195	51	195	51	196	52	13.0	-19.6	11947	197	47	187 46
20	488	25	-22.4	-37.7	18855	197	51	197	52	198	54	14.0	-20.5	12702	192	45	186 47
21	470	42	-24.3	-39.8	19786	200	57	200	56	199	56	14.5	-21.4	1976	193	46	186 47
22	452	58	-26.1	-31.9	20702	201	60	201	59	201	57	15.0	-22.3	19650	180	47	182 47
23	435	57	-28.0	-34.0	21622	203	60	203	60	202	58	15.5	-23.2	15241	186	50	185 46
24	418	55	-30.0	-36.2	22528	204	60	204	59	203	58	16.0	-24.1	15916	186	41	187 44
25	402	54	-31.9	-38.3	23493	203	56	203	57	202	57	16.5	-25.0	17105	195	40	189 41
26	387	49	-34.2	-41.2	24331	202	56	202	55	202	56	17.0	-25.9	17717	190	38	190 35
27	372	45	-36.4	-44.3	25207	201	53	201	54	202	55	17.5	-26.8	18076	188	31	188 32
28	358	40	-38.6	-47.5	26085	199	56	201	55	202	55	18.0	-27.7	18020	186	28	187 29
29	345	35	-40.7	-50.7	26952	203	55	203	55	203	55	18.5	-28.6	19781	187	26	186 32
30	332	30	-42.8	-53.9	27818	206	53	204	54	203	56	19.0	-29.5	20295	187	31	187 33
31	318	25	-45.0	-57.4	28723	202	58	203	57	204	58	19.5	-30.4	20976	187	41	188 39
32	304	20	-47.4	-61.6	29719	204	61	204	60	205	60	20.0	-31.3	22384	190	37	190 40
33	290	15	-49.8	-66.3	30711	207	61	206	62	206	62	20.5	-32.2	23000	191	36	191 39
34	278	10	-51.0	-71.5	31641	207	63	207	64	207	64	21.0	-33.1	23603	189	45	188 40
35	266	5	-54.2	-78.9	32572	206	69	208	67	207	66	21.5	-34.0	24003	185	43	186 41

SEA 7 JANUARY 1961 2330Z

TIME	PRES	RH	TEMP	DP	HEIGHT	1 MIN	2 MIN	4 MIN	TIME	PRES	RH	TEMP	DP	HEIGHT	1 MIN	2 MIN	4 MIN
MIN	MB	%	°C	°C	FT	MSL	DEG KNOT	DEG KNOT	MIN	MB	%	°C	°C	FT	MSL	DEG KNOT	DEG KNOT
							RUN AV	RUN AV							RUN AV	RUN AV	
0	1003	86	10.1	7.9	50				0	987	78	10.0	6.3	489	170	18	
1	968	73	9.3	4.3	1019	166	31	168	30	953	67	9.5	4.5	1587	169	38	169 38
2	948	70	8.5	3.5	2107	172	37	172	37	928	67	8.5	3.5	2107	172	37	174 33
3	928	66	7.9	2.0	2107	172	37	172	37	903	66	7.9	2.0	2107	172	37	174 32
4	898	65	7.3	1.0	2107	172	37	172	37	878	65	7.3	1.0	2107	172	37	174 32
5	860	64	6.6	0.5	2107	172	37	172	37	840	64	6.6	0.5	2107	172	37	174 32
6	828	62	5.9	0.2	2107	172	37	172	37	792	62	5.9	0.2	2107	172	37	174 32
7	795	62	5.2	-0.1	2107	172	37	172	37	757	62	5.2	-0.1	2107	172	37	174 32
8	769	62	4.5	-1.6	7195	192	44	190	44	722	65	4.5	-1.6	688	199	26	200 26
9	742	62	-0.3	-18.4	8136	190	41	190	42	178	62	-3.1	-6.5	6853	205	24	203 27
10	716	27	-2.9	-20.3	9081	188	42	188	42	188	44	15.5	-8.0	8754	210	24	209 24
11	690	28	-5.6	-22.2	10033	185	45	185	44	186	45	16.0	-9.5	9720	203	30	201 25
12	664	28	-8.2	-24.1	10586	183	47	184	47	186	46	16.5	-11.0	10162	191	33	191 24
13	642	29	-10.6	-25.9	11874	185	48	185	48	186	49	17.0	-11.8	10799	179	20	182 22
14	619	30	-13.0	-27.8	12764	187	50	187	51	188	54	17.5	-12.7	10799	177	11	178 21
15	596	30	-15.7	-29.8	13732	189	55	189	57	189	61	18.0	-13.6	12188	177	11	178 21
16	571	24	-16.9	-33.7	14758	191	67	191	68	189	69	18.5	-14.5	13721	183	19	183 24
17	549	22	-18.2	-35.9	15736	190	85	190	81	189	76	19.0	-15.4	14251	187	27	186 24
18	529	20	-19.5	-38.1	16666	188	89	188	87	189	82	19.5	-16.3	12551	187	27	186 24
19	508	18	-20.8	-40.4	17619	188	84	188	86	187	86	20.0	-17.2	12995	187	30	187 28
20	487	18	-23.2	-42.1	18645	187	89	187	88	186	87	20.5	-18.1	13528	187	30	187 30
21	466	19	-25.7	-43.9	19673	185	90	185	88	184	87	21.0	-19.6	13944	186	31	187 32
22	447	19	-28.1	-45.6													

APPENDIX B

This section contains the list of pilot reports used in the analysis of the time section.

JANUARY 6, 1961

0540Z 5 W SEA 30 CAVU N and W
1540Z TOPS PAE 50 /⊕ ABV
1730Z OVR PAE 100 ⊕ LYRD 310
1730Z S TCM MDT RIME AND CIR ICG AT 110
1740Z TCM S BND TOPS 170-200 BLD UP TO W
1745Z OVR TCM 80 ⊕ SCTD BLO 0°C
1825Z LGT RIME 80-100 20W TCM
1825Z 20W TCM LGT RIME LGT-MDT TURBC 80-100
1840Z EPH-ELN-SEA 140 MDT RIME ICG TMP-4
1940Z 10 S TCM 50⊕130 THN CI ABV
2010Z 70 S BF1⊕TOPS 35M
2025Z OVR TCM⊕340
2100Z CI TOP 320 AT 350 TMP -51 WIND 235 AT 68
2130Z OUR PAE 36 ⊕
2130Z TCM 8⊕ V⊕10 40⊕165 R+ 8⊕V⊕10 40⊕R+
2200Z TCM 4⊕18 50⊕290
2330Z OVR TCM 10 ⊕ 30 100⊕240
2345Z 30 S TCM TPS 300

JANUARY 7, 1961

0020Z NO CLDS INDICATED WIND AT 280 250 AT 82
0131Z E TCM T OVC 266
0240Z VCY TCM BETWEEN LYRS AT 70
0345Z T OVC 230 VCY TCM
1815Z OUR TCM ⊕ 320 TOP OF FOG 450 FEET
2105Z OUR PAE 200 ⊕ 300

JANUARY 8, 1961

1520Z 10 W TCM TPS 50-70
1650Z ⊕80 OVR TCM
1749Z C/O PAE ⊕ 45-55 MDT TURBC ON C/O
2245Z OUR TCM 35⊕150 190 220/⊕ABV